ELECTRICAL WEST

September 1954
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.

Field Lab for Street Light..... 92

Jubilee Promotions 106

Tension Stringing 98

Annual Lighting Issue

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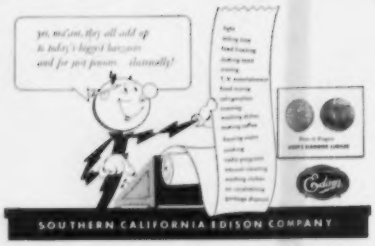
yes, ma'am, they all add up to today's biggest bargain and for just pennies... electrically!
SOUTHERN CALIFORNIA EDISON COMPANY

BARGAINS . . .

When it comes to electric se
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of all electrical services perf
homes.

The series of advertise
continuation of Edison mes
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found that talking about
in terms of *pennies* is a big
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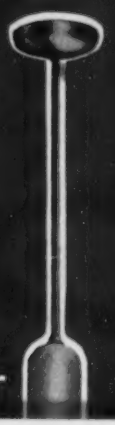
PAG

1954 is the year of

LIGHT'S DIAMOND JUBILEE

SOUTHERN CALIFORNIA EDISON COMPANY



See better with→QUALITY LIGHTING

168 TROFFER

OFFICES

COLLEGIATE

SCHOOLS-OFFICES

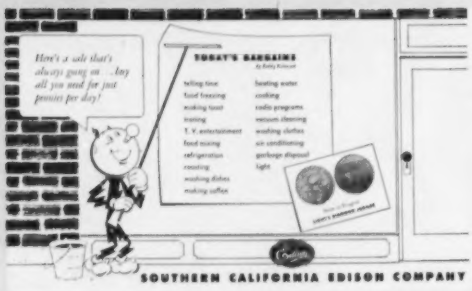
INDUSTRO-LUX

FACTORIES

MASTER

FLOODLITE AREAS

SALES OFFICES IN MOST PRINCIPAL CITIES • BRANCH OFFICE — WAREHOUSE SAN FRANCISCO


Here's a sale that's always going on ... buy all you need for just pennies per day!
TODAY'S BARGAINS
SOUTHERN CALIFORNIA EDISON COMPANY

BARGAINS . . . EVERY ONE !

When it comes to electric service, "pennies per day" is more than just a catch phrase. It's the actual cost of all electrical services performed in our customers' homes.

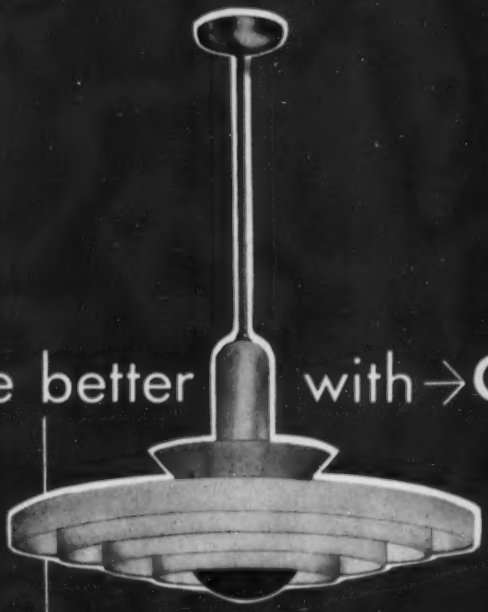
The series of advertisements shown here is a continuation of Edison messages designed to impress that point upon customers. And alert dealers have found that talking about appliance operating costs in terms of *pennies* is a big help in selling appliances and the invaluable services they provide.

1954 is the year of

LIGHT'S DIAMOND JUBILEE

Edison

SOUTHERN CALIFORNIA EDISON COMPANY



See better with→QUALITY LIGHTING

168 TROFFER

OFFICES

COLLEGIATE

SCHOOLS-OFFICES

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FACTORIES

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FLOODLITE AREAS

Vision is a source of knowledge. To increase learning ability, increase vision. SMOOT-HOLMAN "QUALITY" lighting fixtures are engineered for the classroom. Sturdy concentric rings of the CIRCL-LITE offer the greatest efficiency of low-brightness indirect illumination. A comfortable, better controlled light for the rigid requirements of classroom seeing. Dust free, contemporary designs are a major advancement of classroom beauty. Approved by the State of California Division of Architects as EARTH-QUAKE PROOF. You can apply other SMOOT-HOLMAN "QUALITY" lighting fixtures to your lighting needs. Specify and Install "QUALITY"—THERE IS A DIFFERENCE—

SALES OFFICES IN MOST PRINCIPAL CITIES • BRANCH OFFICE—WAREHOUSE SAN FRANCISCO

SEPTEMBER 1954

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-seventh year of publication

VOL. 113 NO. 3

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Associate Editor — John Coetz, Typography

Next Month

Great interest was shown in Electrical West's spot survey dealing with the shortage of electrical engineers published in the December 1952 issue. So much interest in fact that we made a comprehensive survey of colleges and utilities to determine more accurately the number of engineers required by the electrical industry in the West. Results of this survey will be published in October.

Another large steam plant has gone into operation, the Valley plant of the Los Angeles Department of Water & Power. This installation will be described next month.

Of particular interest are the extra high voltage transmission plans of the Bonneville Power Administration. E. C. Starr, new BPA chief engineer, will tell of these plans and the philosophy behind them.

Underground construction techniques are of particular current interest in the West. Treatment will be given two recent installations, one in San Francisco and one at the new University of California campus at Goleta.

What an illuminating engineer did with lighting in his moderately priced home, from the utilitarian to the decorative and aesthetic aspects, will give the architect and builder some new ideas for home lighting.

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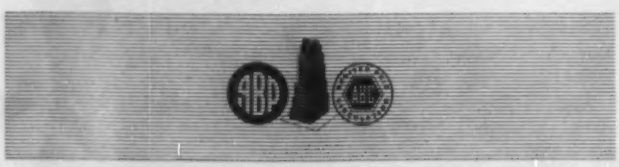

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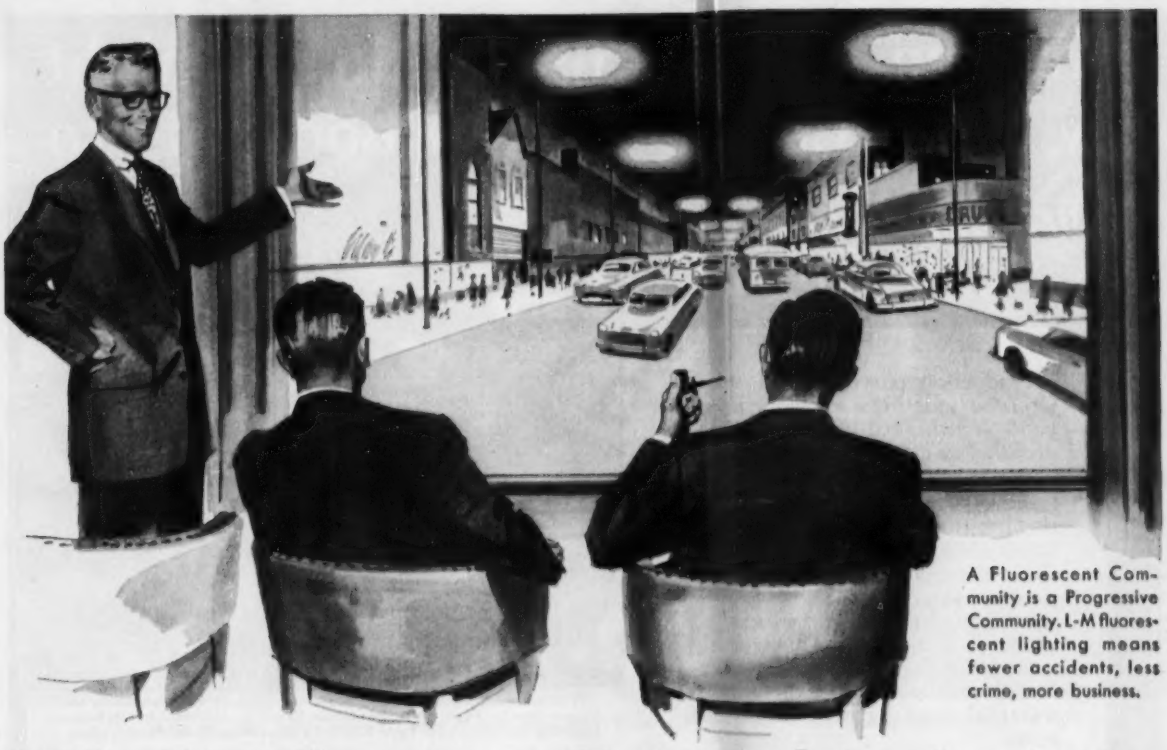


A Fluorescent Community is a Progressive Community. L-M fluorescent lighting means fewer accidents, less crime, more business.

L-M's New Fluorescent Street Lighting Luminaire
Large Light Source, Minimum Glare

By **STACY STANDLEY**
Manager
Lighting Sales
Line Material Company

L-M's New Fluorescent Luminaire is a revolutionary improvement in street lighting. With its large light source the fluorescent luminaire produces an even, cool white color over a large area. Because of its large light source, it provides virtually glareless illumination.

Fluorescent luminaires provide a light that is particularly advantageous in business and shopping sections. The surrounding sidewalk area adjacent to the curb is illuminated and gradually fades out to make the background contrast as gradual as possible. This provides a wider scope of vision for both the motorist and the pedestrian, in addition to creating a cheerful and active atmosphere in the shopping area.

L-M's New Fluorescent Luminaires are available in these styles:

1 4-lamp V-shape for use on wide streets

2 4-lamp bi-directional tilted 20° toward the street for narrower streets and entrance ways

3 4-lamp bi-directional with level horizontal mounting for center parkway and area lighting

4 2-lamp uni-directional for underpass, flood lighting, perimeter and ramp lighting

The fluorescent lamp used in these luminaires has a rated lamp life of 7500 hours. This longer lamp life reduces the cost of relamping luminaires below any other type now used for street lighting.

Features of L-M's New Fluorescent Luminaires

Large light source • Even, cool white color • Minimum glare • Low power consumption • Longer lamp life

Separate efficient reflecting system for each lamp • Good vertical component across the whole surface of the street • Good balance between building and road surface

Two lamp ballasts • Easy accessibility for relamping • Wiring terminal block easily accessible • Ballast can be removed very simply • Bracket adjustable ±5° for leveling.

L-M's fluorescent luminaires are easily accessible for cleaning, relamping, wiring terminal block and ballast removal. Four-lamp unit has two ballasts with one tube on either side of the luminaire paired to each ballast. Thus, if one tube burns out, the light output of the luminaire is reduced only 50% in each direction. Also, if desired, two lamps could be switched off for part night circuits.

Get Complete Information

Details of the new L-M fluorescent luminaires are available. Ask the L-M Field Engineer for information, or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

LINE MATERIAL

196-A-2

Street Lighting

You can increase production at night by using Crouse-Hinds Floodlights to

"turn night-time into day-time"

Production curves go up when Crouse-Hinds high efficiency floodlights are installed in yards and approaches to industrial plants.

The usefulness of many outdoor areas can be multiplied by flooding them with controlled illumination. Crouse-Hinds all-inclusive line with short, medium, and long range projectors makes it possible to get the right amount of light at the locations where it is needed. This control insures the clarity of daylight where it will do the most good, without wasteful over lighting of unused areas.

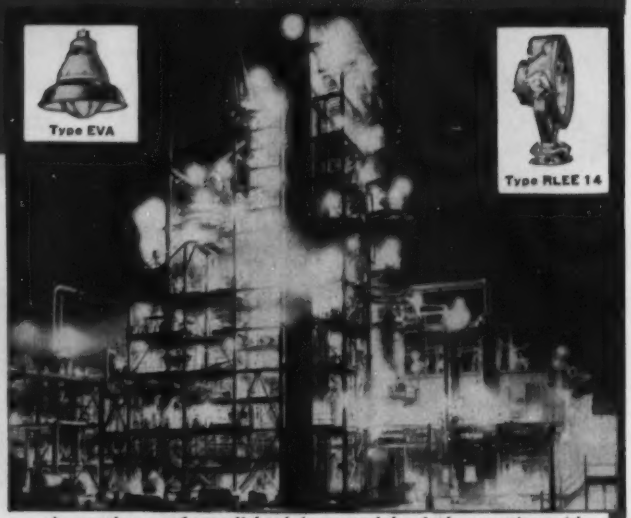
Frequently it will cost much less to project light a considerable distance with Crouse-Hinds long range floodlights than to run cable and install local lighting. There are also indoor locations in large buildings where floodlights are the most economical and satisfactory source of light.

Plenty of light is also the most reliable and cheapest form of protection against night prowlers. Sabotage and pilferage thrive in darkness. Crouse-Hinds floodlights project powerful beams of light that bathe all approaches to your property with glaring radiance, compelling everyone to be more visible than in broad daylight.

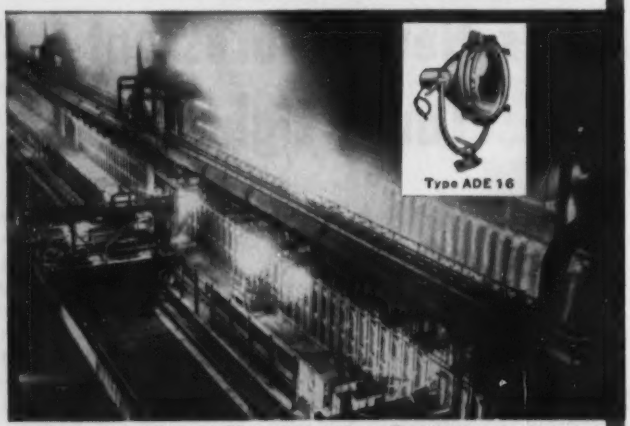
A Crouse-Hinds floodlighting installation pays off in: (1) increased production; (2) prevention of accidents; (3) protection against dangerous prowlers. Pioneers in floodlighting, Crouse-Hinds illumination engineers have accumulated a wealth of lighting knowledge that is at your service. Write for additional information and ask for your FREE copy of Crouse-Hinds Bulletin 2672 "Lighting Equipment". It contains listings of hundreds of types and sizes of floodlights and explosion-proof, dust-tight, and vaportight industrial lighting fixtures.

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

OFFICES: Amarillo — Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Memphis Milwaukee — New Orleans — New York — Philadelphia — Pittsburgh — Portland, Ore. San Francisco — Seattle — St. Louis — St. Paul — Tulsa — Washington.
RESIDENT REPRESENTATIVES: Albany — Atlanta — Baltimore — Baton Rouge — Charlotte Chattanooga — Corpus Christi — Reading, Pa. — Richmond, Va. — Shreveport
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.



A petroleum refinery lighted for round-the-clock operation with Crouse-Hinds Type EVA Explosion-Proof and Raintight Industrial Lighting Fixtures, and Type RLEE-14 Explosion-Proof Floodlights.

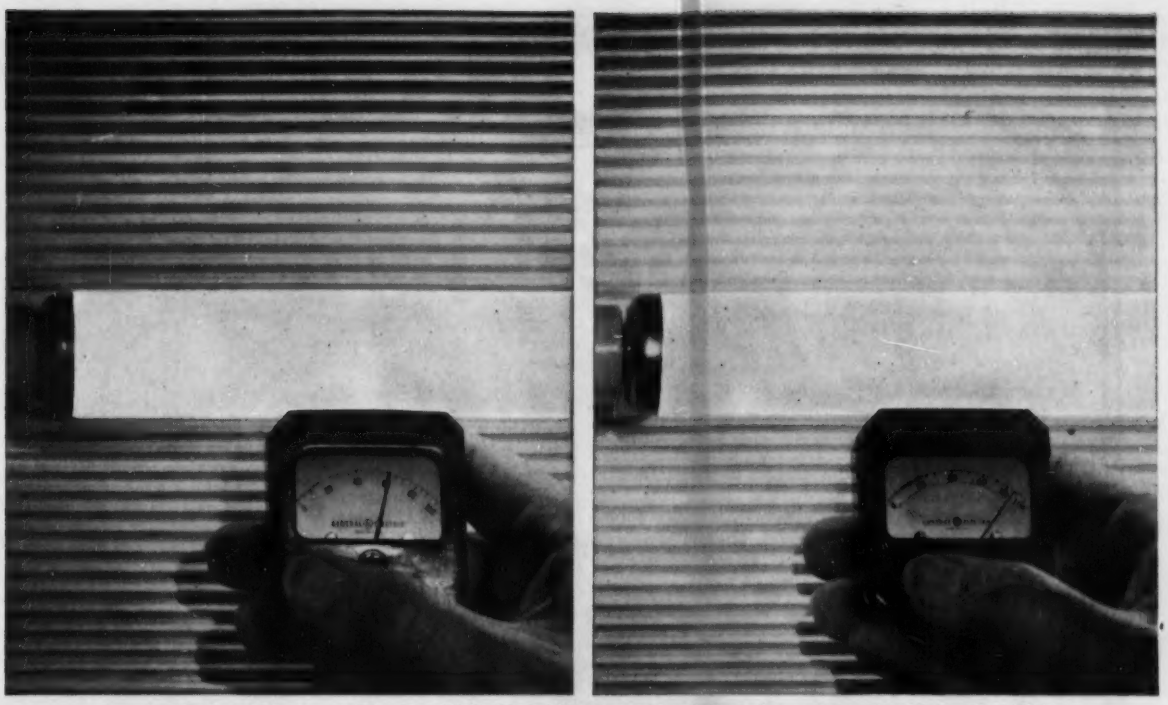


Crouse-Hinds Type ADE-16 Heavy Duty Floodlights are used to "turn night-time into day-time" at this plant for 24-hour production.

A parking lot efficiently lighted by Crouse-Hinds Type FLA General Purpose Floodlights.

A Nationwide Distribution Through Electrical Distributors

FLOODLIGHTS · AIRPORT LIGHTING · TRAFFIC SIGNALS · CONDULETS



Regular slimline, left, gives 620 units of light. New High Output Rapid Start lamp, right, gives 840 units of light.

NEW GENERAL ELECTRIC FLUORESCENT LAMP GIVES ⅓ MORE LIGHT THAN ANY PREVIOUS FLUORESCENT

LIGHTS ALMOST INSTANTLY—General Electric announces the most important advance in fluorescent lighting in 10 years: the new High Output Rapid Start fluorescent lamp. The 96-inch High Output lamp gives 36% more light than the most powerful G-E fluorescent lamp previously available.

For new installations, General Electric High Output lamps offer this ⅓ bonus of light without increasing the number of fixtures or maintenance costs.

This big increase in light, with no increase in lamp size, has been achieved through a special cathode developed by General Electric which permits a boost in lamp wattage to 100. Because the cathode is of the famous General Electric triple coil design, these Rapid Start lamps light up almost instantly. General Electric High Output lamps have a rated life of 7,500 hours, the same as all General Electric general lighting fluorescent lamps.

A new G-E base and socket design protects the lamp contacts by recessing them. A simple push-pull sets the lamp in its fixtures.

HAS VARIETY OF USES

The new General Electric High Output fluorescent lamp is especially suited for use in areas with high ceilings, in factories, warehouses, offices and stores. Also in store windows, showcases and other places where you want higher lighting levels in keeping with the modern trend. New fixtures designed for the G-E High Output lamp will soon be available from a number of lighting fixture manufacturers.

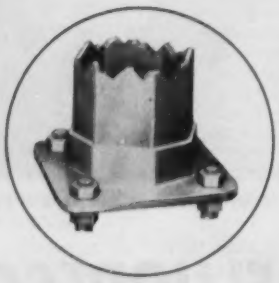
For information, write to Lamp Division, General Electric Company, Dept. 166-EW-9, Nela Park, Cleveland 12, Ohio.

Progress Is Our Most Important Product

GENERAL ELECTRIC

CARCO

Steel Light Poles



SHIMMING ELIMINATED

Erection and plumbing of standard Carco anchor base and transformer base poles are combined in one easy operation. This is done by placing an extra nut on each anchor bolt before setting the pole. The simple adjustment of these nuts under pole base brings it quickly to plumb. Shimming is completely eliminated.

Write our Light Pole Division for copy of new catalog on Carco steel light poles.

EXACTING TESTS PROVE STRENGTH OF CARCO STEEL LIGHT POLES

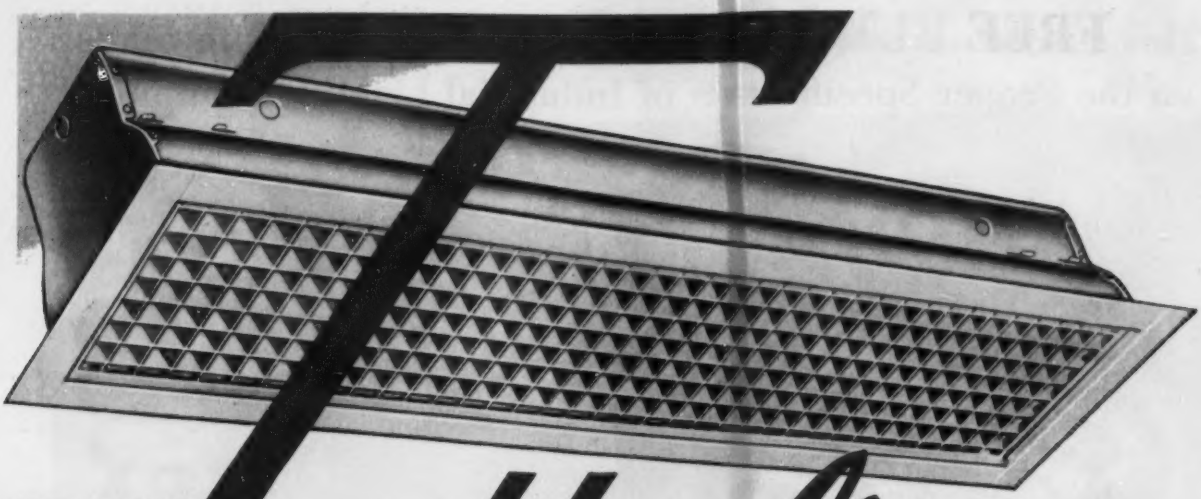
Pictured above are several city engineers witnessing one of the tests continually being made to prove beyond a question of doubt the strength of Carco steel light poles. Hung from the A frame in foreground is a dynamometer, while an electrical strain gauge rests on concrete block to which pole base is attached. The purposes of these tests are two-fold: (1) to determine strength of base in relation to strength of pole and (2) to determine loads that pole can carry in terms of bracket, road signs, signals, decorations and wires, particularly when iced or subjected to strong winds. In every test ever made Carco steel light poles have exceeded the most exacting specifications. Designed to meet the I. E. S. street lighting code, Carco poles offer buyers of lighting equipment many exclusive advantages that make for added strength and permanence, easy erection and maintenance. Carco standard poles are available in either anchor base or transformer base types with mounting heights from 21′ 6″ to 31′ 6″. Underbraced brackets from 4 to 8 feet are available as are overbraced brackets from 10 to 15 feet. Special poles and brackets quoted on request. It will pay you to investigate Carco steel light poles. Your inquiry will be promptly handled.

PACIFIC CAR AND FOUNDRY COMPANY

RENTON, WASHINGTON

STEEL LIGHT POLES, RAILROAD CARS, TRACTOR EQUIPMENT: Winches, Logging Arches, Log Carts, Dozers
STRUCTURAL STEEL FABRICATION AND ERECTION, STEEL CASTINGS, FORGING

CARCO®



RECESSED *Trofferlites*

for Interiors of Distinction

TROFFERLITE ACCESSORIES

DIRECLITE adjustable, incandescent spotlight.

CORNER FILL-IN joins sides of rectangular arrangements.

COMPLETE RANGE OF SIZES

12" Regular · 12" Shallow · 24" Shallow · 24" Regular

BAFFLE LOUVER for locations requiring extra-high light levels.

GLASS ENCLOSED means less maintenance, better lamp operation.

6 MOUNTING STYLES —general purpose, T-bar, Simplex ceiling, plastic frame, wood furring and channel furring (illustrated).

MOLDED PLASTIC LOUVERS No warpage

5 LAMPING ARRANGEMENTS

12"—1 lamp · 12"—2 lamps · 12"—3 lamps · 24"—4 lamps · 24"—6 lamps

Versatility *plus* efficiency and distinctive appearance . . . that's *Trofferlite*. Offices, stores and commercial establishments of all kinds take on a new look of distinction with these trim, slender units which appear to be a part of the ceiling. There is no limit to the variety of designs, arrangements and architectural effects you can achieve with these recessed Troffers. They are available in a wide range of styles and sizes, in individual units or continuous rows, as shown at left.

For Interiors of Distinction, specify Versatility "*Plus*" . . . specify recessed *Trofferlites*. Complete catalog data sheets sent on request.

BENJAMIN

Leader Line

Sold Exclusively through Electrical Distributors

TD-275RJ

Exclusive licensees of the Leader Line in Canada: Robertson Irwin Limited, Hamilton, Ontario

Benjamin Electric Mfg. Co., Leader Division, Dept. J, Des Plaines, Illinois, also makers of famous Benjamin lighting equipment and sound signals for Industry, Institutions and Commerce.

This **FREE RLM BOOK** brings you valuable information on the Proper Specification of Industrial Lighting Equipment

provides you with Specification Data covering

4 ESSENTIALS to GOOD LIGHTING EQUIPMENT PERFORMANCE

and the names of manufacturers from whom you can secure such equipment

These are the 4 ESSENTIALS TO GOOD LIGHTING EQUIPMENT PERFORMANCE ASSURED BY THE RLM LABEL:

1. High Light Output—to assure you of **MORE LIGHT FOR YOUR MONEY**
2. Proper Shielding—to assure you of **MAXIMUM PROTECTION FROM HARMFUL GLARE**
3. Quality Construction—to assure you of **MINIMUM MAINTENANCE COSTS**
4. Uniform Quality from fixture to fixture —to assure you of **UNIFORMLY SATISFACTORY RESULTS** throughout the lighting system

● Everyone who buys, sells and specifies industrial lighting equipment should have a copy of this helpful 52-page reference work. It contains nationally-recognized standard specifications for 75 types and sizes of industrial lighting units. Each one of these specifications incorporates the first three of the four "Essentials to Good Performance" listed at the left.

The RLM Specifications Book also explains fully *why* the RLM Label on lighting units is a Warranty for Uniform High Quality. It points out why you can rely on RLM-Labeled units of the same manufacturer to maintain a certain quality level within your lighting system. Knowing that you can depend on such uniform quality, saves time, money and labor, in terms of such factors as uniformity of illumination, minimum service interruptions, low operating and low maintenance costs.

Also included with this free book is a list of the manufacturers who make RLM-Labeled lighting units. Act now to get up-to-date on proper specification of lighting equipment that assures you of 4 Essentials of Good Lighting Equipment Performance! Send for your free copy of the RLM Specifications Book. RLM Standards Institute, Suite 815, 326 W. Madison St., Chicago 6, Ill.

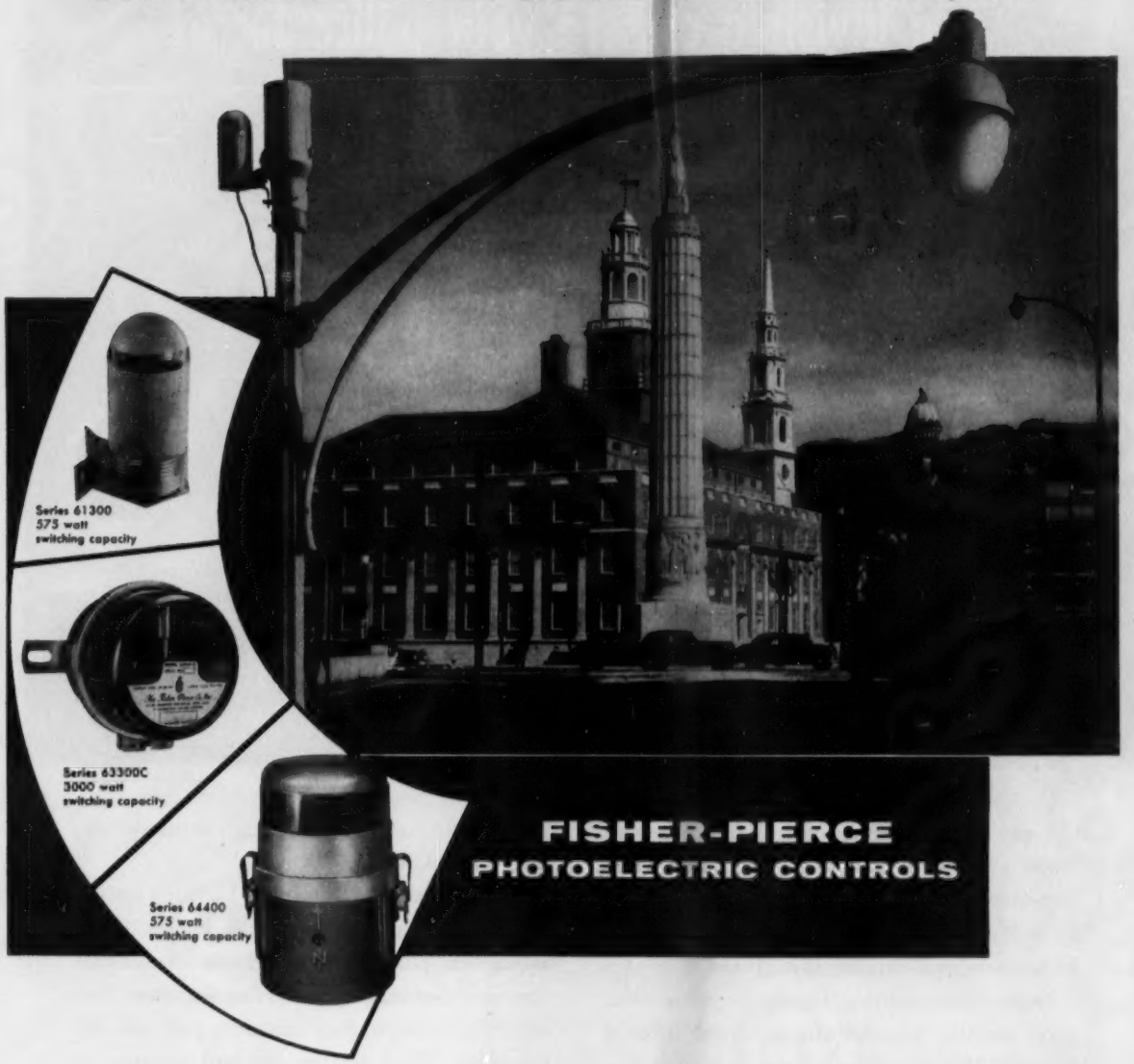
RLM

ELECTRICAL TESTING LABORATORIES, INC.

RLM STANDARDS INSTITUTE
INCORPORATED

The letters RLM stand for Reflector and Lighting Equipment Manufacturers

CONTROLLING STREET LIGHTS IN PROVIDENCE, R. I.

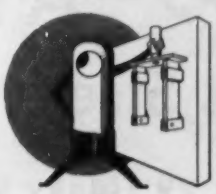


Motorists and pedestrians in Providence can thank their City Government for authorizing The Narragansett Electric Company to install dependable, automatically controlled street illumination.

The use of Fisher-Pierce street lighting controls assures dependable *automatic* illumination of streets the moment daylight drops below a safe value. Because F-P controls are photoelectric, they operate regardless of the hour, the season or the weather.

On the job in Providence since 1946, F-P controls now number about 3000. Narragansett engineers report favorable installation economics *and* an extremely low failure rate — only 2.29% of *all* units during a recent 12-month period.

Long, dependable service of F-P controls — in street lighting control systems in Providence and hundreds of *other* communities — is the basic reason Fisher-Pierce is recognized as a *leader* in its field.



THE
FISHER-PIERCE
COMPANY, INC.
43 Pearl St., So. Braintree, Boston 85, Mass.

EXPORT: PHILLIPS EXPORT CORP.
DIVISION OF NORTH AMERICAN PHILLIPS
100 E. 42ND STREET
NEW YORK 17, N. Y.

IN CANADA:
NORTHERN ELECTRIC CO., Ltd.

Add invisible cops to your police force!

Light and lots of it is the very best deterrent there is to crimes of violence. That is why it is so terribly important that residential streets, as well as boulevards and shopping areas, be adequately and dependably lighted.

Dependable lighting has to be more than good looking, scientifically designed lighting fixtures. The power cables are part of it too. Such cables must be able to withstand winter thaws and freeze-up, as well as summer rains. They must also withstand high summer heat and winter cold.

ANHYDREX Series Street Lighting Cables do this and more. They can be buried in the ground or pulled through ducts. Sometimes they are used inside the lighting standard. But regardless of how they are used, they are dependable. They require no lead sheaths or metallic armor.

Want to know more about these versatile street lighting cables that can be used overhead or underground with or without ducts? Write us directly or contact our representative in your area for more detailed information.

Simplex—ANHYDREX

Series Street Lighting Cables

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

SUNBEAM LIGHTING; A WISE INVESTMENT, A REAL SAVINGS

You owe it to yourself and your client to make every lighting dollar count. Experience shows over and over again that a wise initial investment leads to many savings in the long run. Quality can be reasonably priced but it cannot be compromised. Invest in planned lighting and in SUNBEAM lighting fixtures which are scientifically designed to produce efficient, effective and comfortable illumination. Invest and save in SUNBEAM Visionaires of quality construction and for long-period, minimum maintenance.

The First National Bank at Santa Fe, New Mexico wisely invested in and installed over 200 Sunbeam #5602-48RS recessed units equipped with curved Controlenses®. Mounted at a height of 25 feet (which is a challenge for good lighting) in an attractive pattern, the light output is controlled for maximum, glare-free illumination in the important work zones. Specially engineered for top servicing in this installation, the units will save many dollars in easier maintenance. Sunbeam lighting engineers will gladly, and without obligation show where lighting dollars may be saved on your lighting projects.

SUNBEAM visionaire

SUNBEAM

LIGHTING COMPANY 777 EAST 14TH PLACE LOS ANGELES 21

Years Ahead
in Engineering and Design . . .
Holophane's New Outdoor Unit

415

Product of Holophane Engineering Research, No. 415 is presented as an altogether different lighting unit. Its efficiency, dependability and design are the result of long experience in developing prismatically-controlled lighting equipment for almost six decades.

Unequalled Performance . . .

Asymmetric distribution spreads more light over the widest area . . . providing consistently high levels of illumination under all conditions . . .

Durable Construction . . .

Die-cast aluminum hood and double thick prismatic refractor assure full protection against the elements. Easy to install, easy to maintain—it's trouble-free!

Modern Design . . .

Perfectly proportioned, attractively streamlined, No. 415 is adaptable to any modern exterior.

FOR RESIDENTIAL USE
- Private Homes
- Driveways
- Garden Apartments
- Garages

FOR INDUSTRIAL USE
- Warehouses
- Loading Platforms
- Entrances
- Roadways
- Parking Lots
- Service Stations

FOR PUBLIC AREAS
- Shopping Centers
- Motels
- Hospitals
- Schools
- Churches
- Housing Developments

Holophane

Write for Engineering Data, Dept. 1-16-T

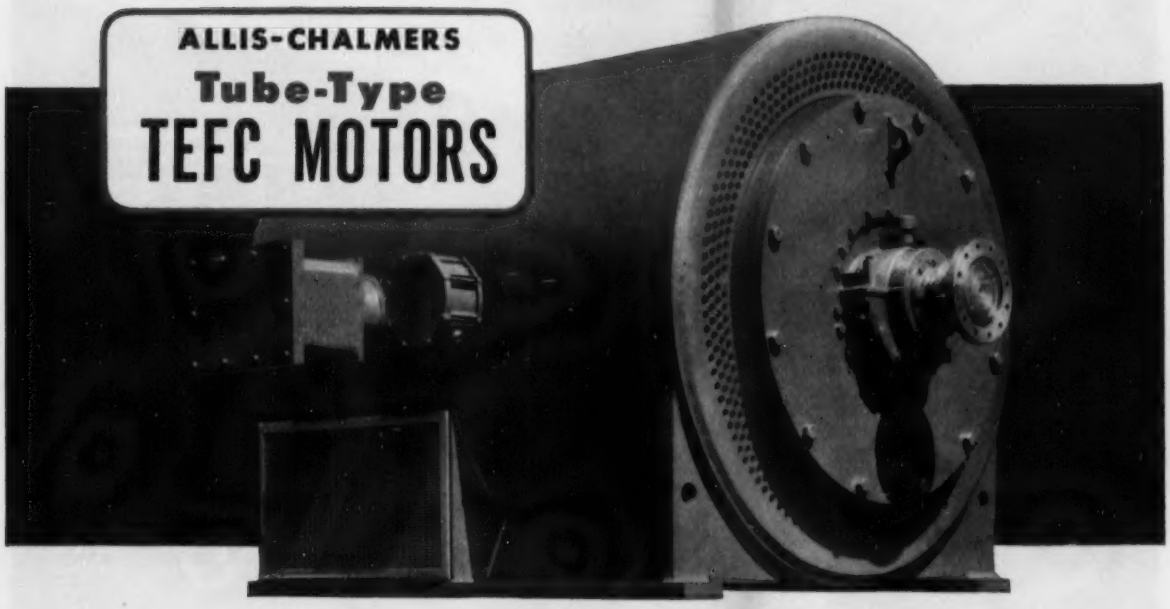
HOLOPHANE COMPANY, INC.

Lighting Authorities Since 1898 • 342 MADISON AVENUE, NEW YORK 17, N.Y.

THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

NOW 1250 Hp – 1780 Rpm Underwriters' Approved

for Class I, Group D Service



Allis-Chalmers explosion-proof motors as large as 1250 hp, 2300 volts, 1780 rpm are now available with Underwriters' Laboratories, Inc. labels for operation in Class I, Group D hazardous locations.

Previous to recent tests, the Allis-Chalmers Underwriter-approved motor line included ratings up to 800 hp, 3600 rpm for operation in Class I, Group D and Class II, Group F and G locations. Now, with the design used for larger ratings also Underwriters' test-proved, Allis-Chalmers can supply explosion-proof motors in other ratings required by industry.

Ratings up to 800 hp, 3600 rpm.

Construction used for larger ratings.

Explosion-Proof Plus

Operation-proved by TEFC motors totaling over a quarter million horsepower, the A-C tube-type air-to-air heat exchanger design combines safety and maximum operating economy. Self-cleaning action cuts maintenance. Full internal air circulation lengthens insulation life. Complete enclosure protects stator core and other electrical parts from dirt and corrosion.

For approved motors for hazardous dust and gas locations, contact your A-C representative, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4436

ALLIS-CHALMERS

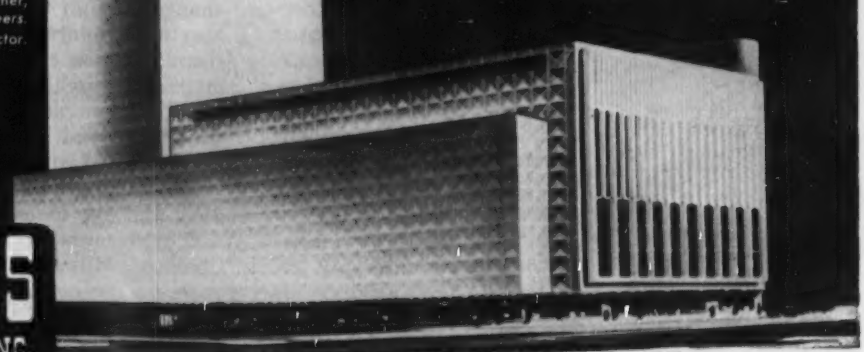
NEW CURTIS TROFFERS

offer all these outstanding advantages

- High levels of quality illumination.
- Visual comfort index rating of 97+.
- Use with all 4', 5', and 8' lamps . . . rapid start, slimline, low-brightness starter type.
- Aluminum, finished by the patented Alzak process AFTER FORMING.
- Steel finished with exclusive Curtis baked white "Fluracite" Enamel.
- Shallow housing permits installation where recessing depth is as little as 6⅞".
- Exclusive "U" support yokes permit one-man installation in any type ceiling construction and cut installation time almost in half.
- Flange or Flush type construction with and without louvers.
- Lower maintenance cost. No horizontal reflecting or diffusing surfaces to collect dust.
- Complete factory assembly with wiring channel and side reflectors formed of one piece aluminum or steel—simplified ordering—each troffer a complete unit.

Harrison & Abramovitz; Gill & Harrell, *architects.*
Fischbach & Moore of Texas, Inc. *electrical contractors.*
Jaros, Baum & Bolles; Zumwall & Vinther, *mechanical and electrical engineers.*
J. W. Bateson Co., *general contractor.*

Over 10,000 Curtis Alzak Aluminum Troffers are now being installed in the new Republic National Bank, Dallas, Texas.

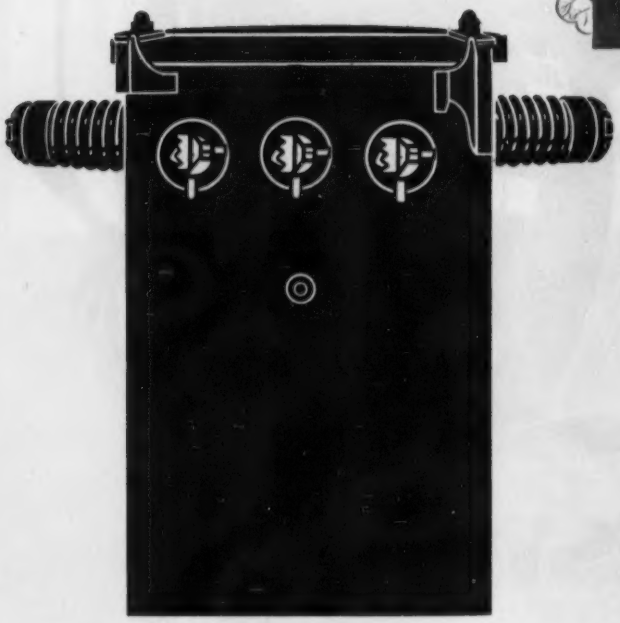


CURTIS LIGHTING, INC.

DEPT. I 16-T, 6135 WEST 65th STREET, CHICAGO 38, ILLINOIS

NAME_____ ADDRESS_____ CITY_____ STATE_____

Kuhlman Distribution Transformers seldom require maintenance



We take pleasure in announcing the appointment of

MAYDWELL & HARTZELL, INC.

as our West Coast representative.

Our customers can be assured of prompt deliveries and helpful service from any of the MAYDWELL & HARTZELL, INC. six centrally located offices in Seattle, Spokane, Portland, San Francisco, Los Angeles and Phoenix.

Because of their design and construction, Kuhlman Distribution Transformers help utilities provide a steady and reliable source of power for American homes at a minimum of maintenance. Construction is sturdy and rigid. Tanks are fabricated of heavy gauge copper bearing steel, tested, and weatherproofed. For voltages through 4800 V., "Quick-Grip" clamp type insulated bushings simplify installation. Tap changer handle extends above oil level so adjustments can be made easily.

The major portion of Kuhlman pole type Distribution Transformers incorporate the well known Bent Iron Core. This core, permitting the flux path to follow the grain of the steel, utilizes the best qualities of cold-rolled oriented silicon steel. Considerable weight savings, reduction in core loss, and low exciting current result.

By achieving balanced design through the Bent Iron Core and other features, Kuhlman Distribution Transformers are engineered to provide exceptionally good voltage maintenance and high efficiency under varying load conditions. Wide oil ducts permit good oil circulation through the windings, maintaining relatively uniform coil temperatures. Kuhlman Transformers, of course, are vacuum treated to insure against trapped air.

Kuhlman Distribution Transformers are available in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202 and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

152-T

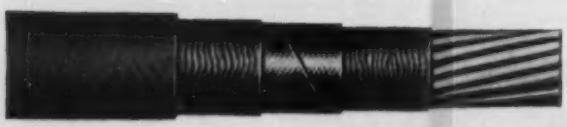
KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

YOUR PLANT
CAN GROW



when you wire
with

ROCKBESTOS AVC®
(N.E.C. TYPE AVA)

WIRE AND CABLE

When you're building your plant, that's the time to install Rockbestos A.V.C. and you will automatically add 30 to 50% more current capacity for future needs.

Get the full story on the practical advantages of Rockbestos A.V.C. — the cable that gives you room to grow.

Phone or write the nearest branch office for a Rockbestos Field Engineer. He's a wire specialist who can save you time and money on your wiring problems.

STOCKED COAST TO COAST
Standard Rockbestos A.V.C. (N.E.C. types AVA, AVB, etc.) are available from stock for immediate shipment. Call or write nearest branch office.

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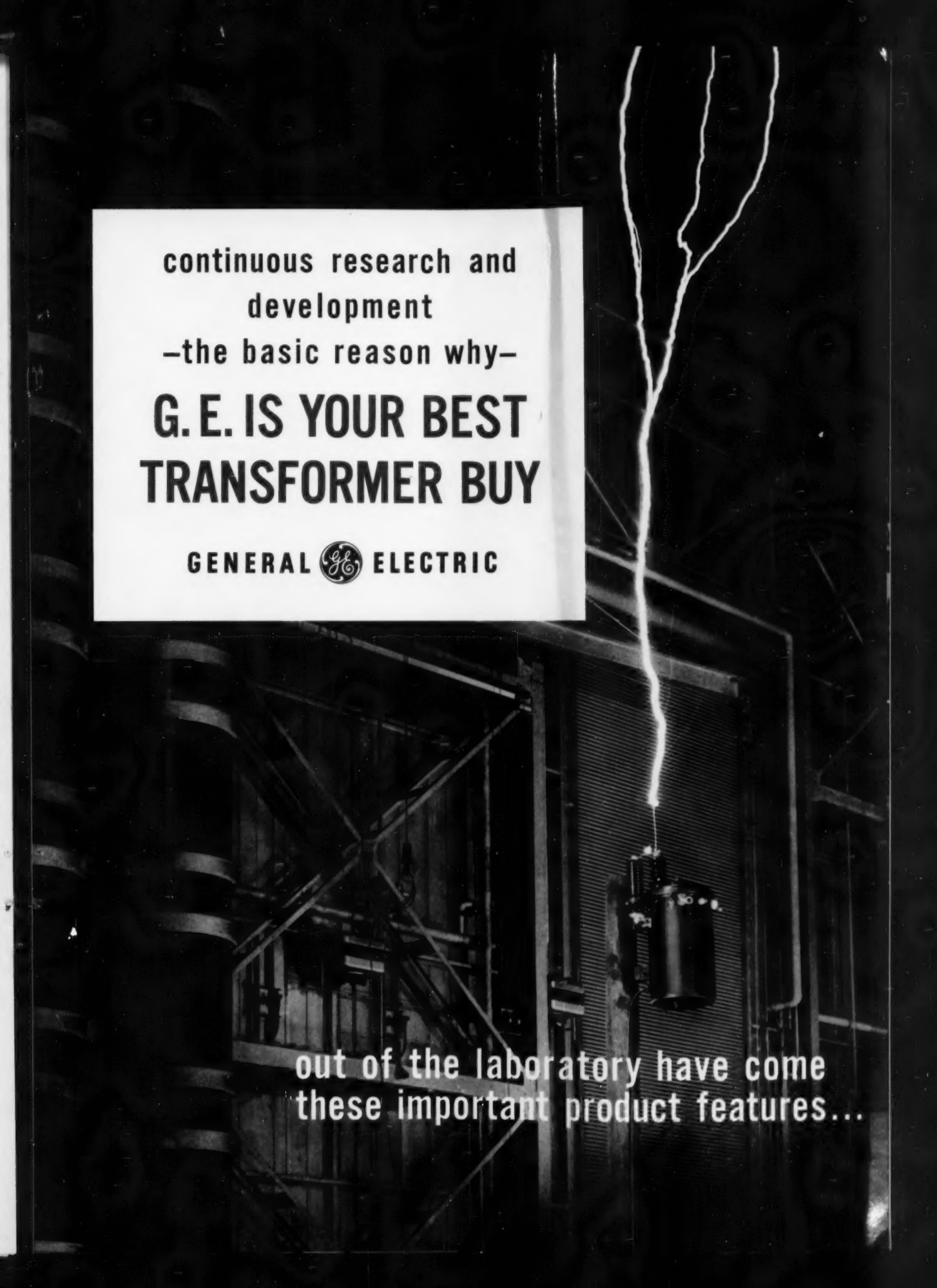
NEW YORK • CLEVELAND • DETROIT • CHICAGO
PITTSBURGH • ST. LOUIS • LOS ANGELES • NEW ORLEANS
OAKLAND, CALIFORNIA • SEATTLE

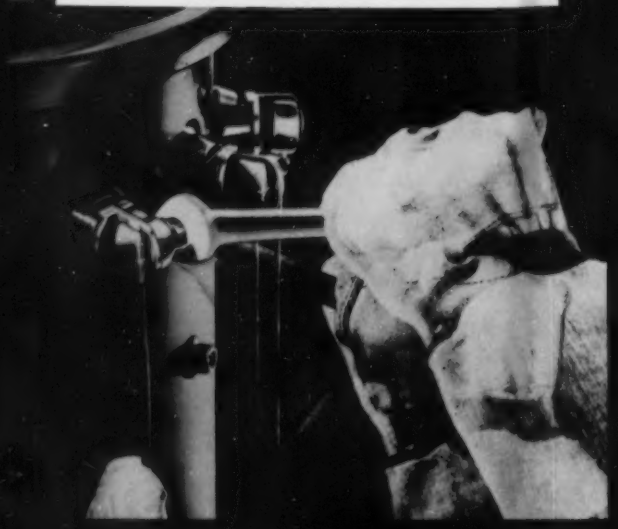

continuous research and
development
–the basic reason why–
G. E. IS YOUR BEST
TRANSFORMER BUY
GENERAL ELECTRIC
out of the laboratory have come
these important product features...

DISTRIBUTION TRANSFORMERS

Only General Electric offers

Strenicor pressure terminal clamps...

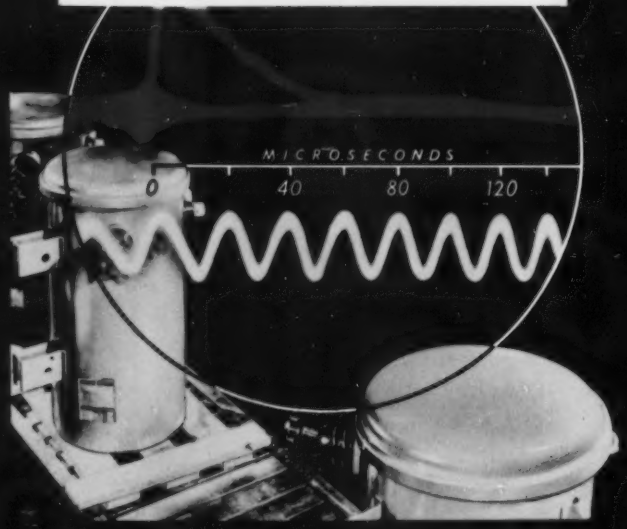
improve service continuity because they resist stress corrosion



General Electric offers

Production-line impulse testing...

assures that you receive only transformers of highest quality



Only General Electric offers

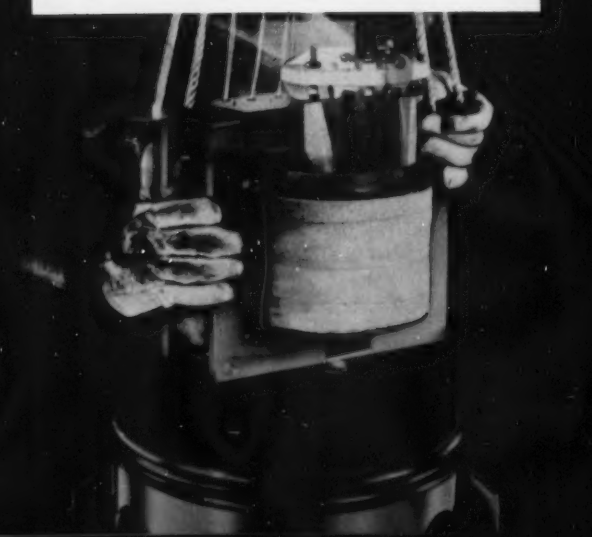
Nitrile rubber gaskets

prolong life of the transformer by sealing out dirt, and by preventing tank breathing

General Electric offers

Nationwide service facilities...

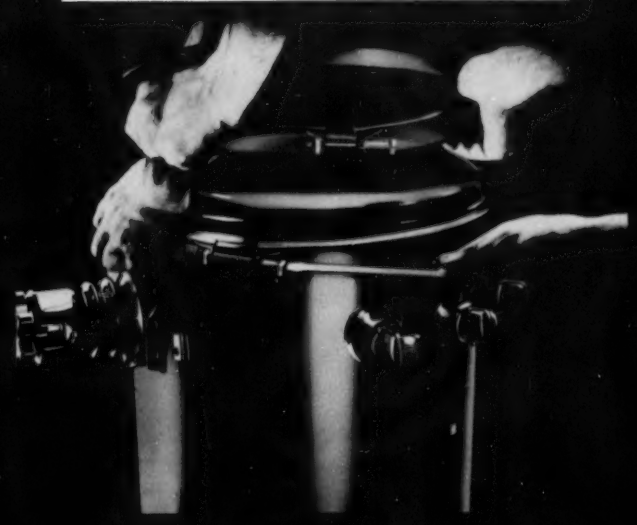
keep your transformers "on the line"



General Electric offers

One-piece cover band...

facilitates inspection... maintains uniform gasket pressure

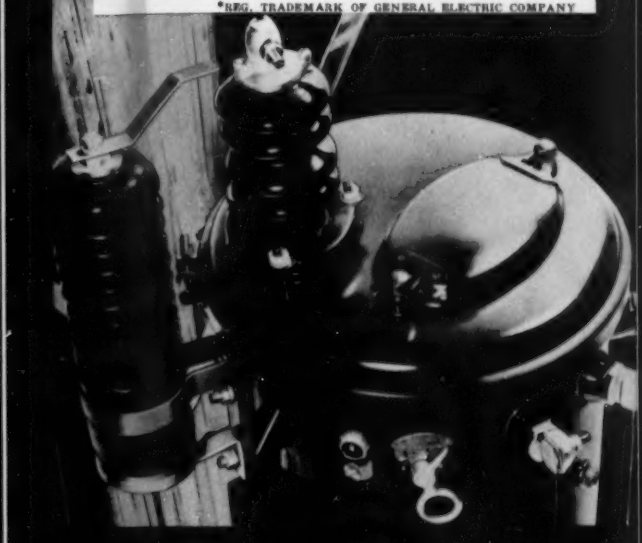


Only General Electric offers

Thyrite* Magne-valve arresters (gapped valve-type)

use them any place on your system regardless of short-circuit currents

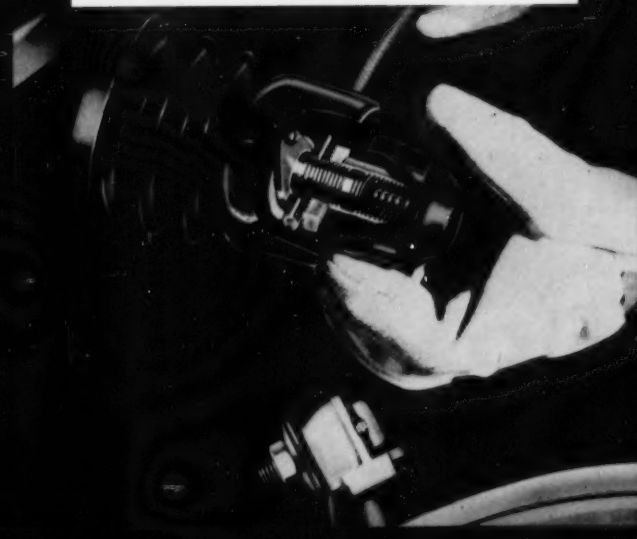
*REG. TRADEMARK OF GENERAL ELECTRIC COMPANY



Only General Electric offers

Bushing terminals to handle both Cu and Al

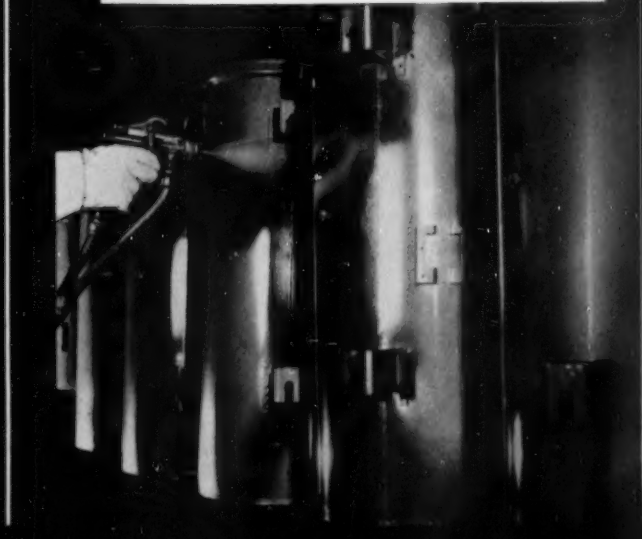
maintain pressure even when "cold-flow" and temperature changes occur



Only General Electric offers

Super Melaglyp...

a new outdoor finish with up to 150% longer life



ALL TRANSFORMERS ARE NOT ALIKE
FEATURE
GENERAL ELECTRIC
AFR. A
AFR. B
AFR. C
AFR. D
AFR. E
Strenicor pressure terminal clamps
YES NO NO NO NO NO
Nitrile rubber gaskets at all tank openings
YES NO NO NO NO NO
Gapped valve-type arresters
YES NO NO NO NO NO
Terminals designed for both copper and aluminum conductors
YES NO NO NO NO NO
Production-line impulse testing
YES NO NO YES NO NO
One-piece cover band
YES NO NO NO NO YES
Nationwide company-operated service facilities
YES YES NO NO NO YES

compare the reasons yourself and see why . . .

G.E. IS YOUR BEST TRANSFORMER BUY

1. **STRENICOR PRESSURE TERMINAL CLAMPS** improve service continuity because they resist stress-corrosion. With a high tensile strength of 107,000 psi and a yield strength of 83,000 psi, Strenicor terminals are practically immune to a failure by stress-corrosion. They virtually eliminate outages and resulting service calls and customer inconvenience caused by failure of secondary terminals.

2. **NITRILE RUBBER GASKETS** prolong transformer life because they prevent tank breathing. Used at all tank openings, the gaskets seal out dirt and moisture, thus prolonging the life of the insulation—and of the transformer. The gaskets require no cement, are usable again and again.

3. **THYRITE MAGNE-VALVE ARRESTERS** can be used any place on your system regardless of short-circuit currents. A gapped valve-type design, Thyrite Magne-valve arresters are small, light, and operate without any internal wearing away regardless of system short-circuit capacity or frequency of operation. This assures long service life.

4. **BUSHING TERMINALS** handle both copper and aluminum. Tin-plated to retard corrosion, the bushings maintain tight connections even if "cold-flow" and temperature changes occur. The new terminals handle both aluminum and copper without special fittings.

5. **PRODUCTION-LINE IMPULSE TESTING** assures you of extra years of service from your transformers. This test automatically picks out transformers which have passed all tests prescribed by the American Standards Association but which may still have minor weaknesses. You receive only transformers of the highest quality.

6. **STAINLESS-STEEL ONE-PIECE COVER BAND** prolongs transformer life and facilitates inspection. Exerting even pressure around rim of tank, the band resists corrosion and stays tight even after years of service. With a tight seal, purity of oil is safeguarded. Yet you need only a screwdriver to remove or replace band for maintenance.

7. **NATIONWIDE SERVICE FACILITIES** assure you of fast help when a storm strikes—or when routine repair work piles up. Located at industrial centers from coast to coast, General Electric's 30 service shops are staffed by factory-trained personnel ready to give you fast, emergency service or to handle your routine repair work.

8. **SUPER MELAGLYP** saves you money by greatly reducing your repainting costs. A new paint finish that averages 50% longer life, Super Melaglyp gives you up to 150% more protection than finishes formerly used. General Electric Company, Schenectady 5, New York.

431-20

Progress Is Our Most Important Product

GENERAL ELECTRIC

B-M *Fittings*

ARE APPROVED AS CONCRETETIGHT

When setting E. M. T. in concrete you can make each job easier and more profitable by using Briegel All Steel Indenter Fittings that have U.L. approval as CONCRETE-TIGHT. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job a better job. It is only natural that Briegel Fittings are the most widely used E. M. T. connectors and couplings.

Cross Section Showing Indentations.

All B-M Indenter Fittings are U. L. approved as Concrete-tight and for General Use. (File Card E 10863). Also comply with Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

One
This one

company

One company launched the aluminum industry.

One company has 66 years of aluminum research and production experience.

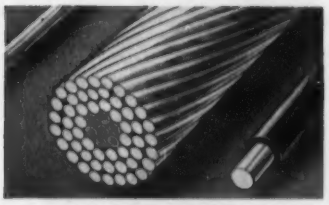
One company has 56 years of technical and field experience with aluminum conductors.

One company maintains the outstanding research, development, testing and production facilities in aluminum conductors.

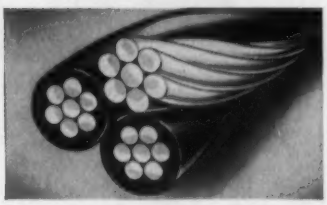
One company has developed and improved aluminum conductor alloys and aluminum conductor designs.

One company manufactures and stands behind a dependable line of both aluminum electrical conductors and accessories.

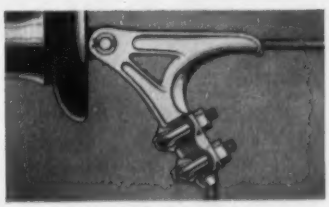
One company maintains a complete headquarters and field engineering staff to assist those who transmit and distribute electric energy.



ACSR and All-aluminum Wire and Cable



Covered Wire and Service Drop



Accessories for All Conductors

company is ALCOA

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

Hotpoint

automatic clothes dryers expand opportunities for utility revenue

Automatic Dryers are used almost exclusively during off-peak hours . . . also their individual load is quite large. For these two reasons, widened sales of automatic dryers are most desirable for producing higher utility revenue.

Now—just look how Hotpoint has expanded the opportunity for this increased utility revenue.

The Hotpoint Dryer with its Sealed Drying Chamber does a masterful drying job, it's true . . . but what the Hotpoint Dryer *doesn't* do is just as important. Unlike other dryers, Hotpoint *doesn't* allow heat, moisture, and lint to enter the laundry area. Also the Hotpoint Dryer *doesn't* suck in dust and dirt to soil freshly laundered clothes. And, most important, the Hotpoint Dryer *doesn't require ugly, expensive venting.*

These advantages mean that every family can efficiently use a Hotpoint Dryer . . . whether in the utility room, den, kitchen, basement, bathroom, closet, or anywhere. No *special* place is needed. Thus the opportunity for revenue from automatic dryers is much expanded. The results enjoyed by owners of Hotpoint Dryers are accelerating automatic dryer acceptance. Have your Hotpoint distributor give you the complete facts on the Hotpoint Automatic Clothes Dryer with Sealed Drying Chamber. Learn the profit opportunities for right now, and for the future.

Again, Hotpoint *looks at Tomorrow, Today!*

HOTPOINT Co. (A Division of General Electric Company) 5600 West Taylor Street, Chicago 44, Illinois

it's time for a new meter...

when Mrs. Riley...

gets her electric range

Since the day she took up the role of homemaker, Edith Riley has had a gas stove, of one kind or another, in her kitchen. But times have changed, and, well . . . the Rileys are getting an electric range this time.

The Rileys, and the thousands of American families like them who are turning to electricity to do more and more things, are going to need high capacity meters.

There is a new extended range meter on the market that will easily handle the heavier loads created by the rapidly increasing use of electricity. It's the Sangamo J2, a 15 ampere meter with straight-line accuracy up to 100 amperes. As a matter of fact, the J2 has the capacity to carry 100 amperes *continuously* without overheating, yet it has sufficient torque to accurately measure even the lightest load.

When you invest money in meters you know are going to have to handle greater and greater loads, protect your investment by choosing a meter with plenty of reserve ability to measure the growing use of electricity.

Choose the new Sangamo J2—the first . . . and finest . . . 15 ampere meter with 100 ampere capacity.

A METER WITH STRAIGHT LINE ACCURACY

UP TO 100 AMPERES

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM54-7

setting the pace of transformer design for the industry

New LX-T arrester has 300% greater "dynamic" current rating

The new LX-T lightning arrester for Westinghouse "CSP®" distribution transformers is an excellent example of the progress which has been made with expulsion arresters to keep pace with distribution system requirements.

You can install Westinghouse "CSP" transformers at any point on your distribution system. This includes—up close to a substation where dynamic current is high or at the end of your rural lines where it is low. The LX-T arrester has large surge current capacity and at the same time has exceptionally high, 60-cycle current limiting ability.

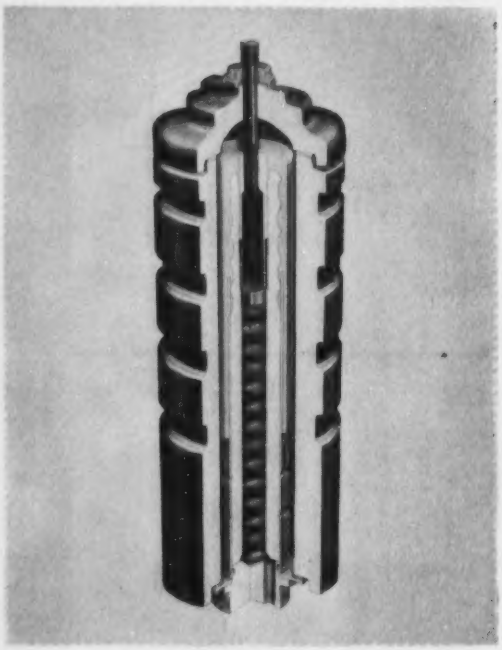
Greater current limiting action gives the LX-T the highest short-circuit rating of any expulsion arrester (20,000 amperes at 3 kv, 12,000 amperes at 9 kv). A unique arc-spiraling action which stretches out the path of 60-cycle current is the big reason. If power current does flow, the unique arc-spiraling action effectively limits the flow to a very small magnitude and to a small fraction of a half cycle. Current limiting action is so effective that it *prevents any* flow of power current in at least half of all operations.

The new arrester is ruggedly mounted directly to the wall of the "CSP" transformer where it provides maximum coordination with high-voltage bushings and transformer insulation level. It is available in 3-kv, 6-kv and 9-kv ratings.

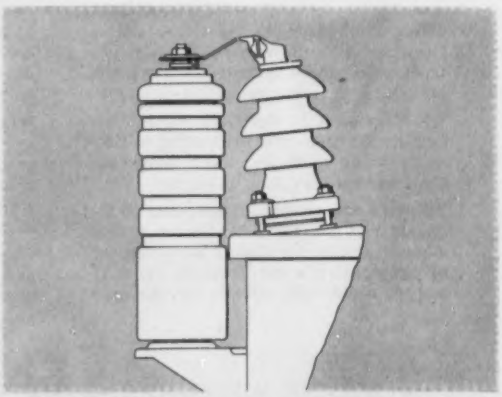
This latest development is just one of many arrester advances made since the first expulsion arrester was introduced by Westinghouse in 1932. Since then, excellent performance of 2,575,000 transformer arresters representing 18,000,000 "arrester years" has proved the effectiveness of the Westinghouse De-ion® arrester. The LX-T design has already been proved through 3 years of successful field experience with the LX distribution arrester.

For further details call in your nearby Westinghouse representative or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-70731



The cutaway LX-T shown, illustrates the spiral filler which stretches out the path of 60-cycle current and limits it in both magnitude and duration.



The top-series gap permits the arrester to be isolated from the line voltage except when operating. The spark-over of the LX-T is well below the BIL of the transformer it protects.

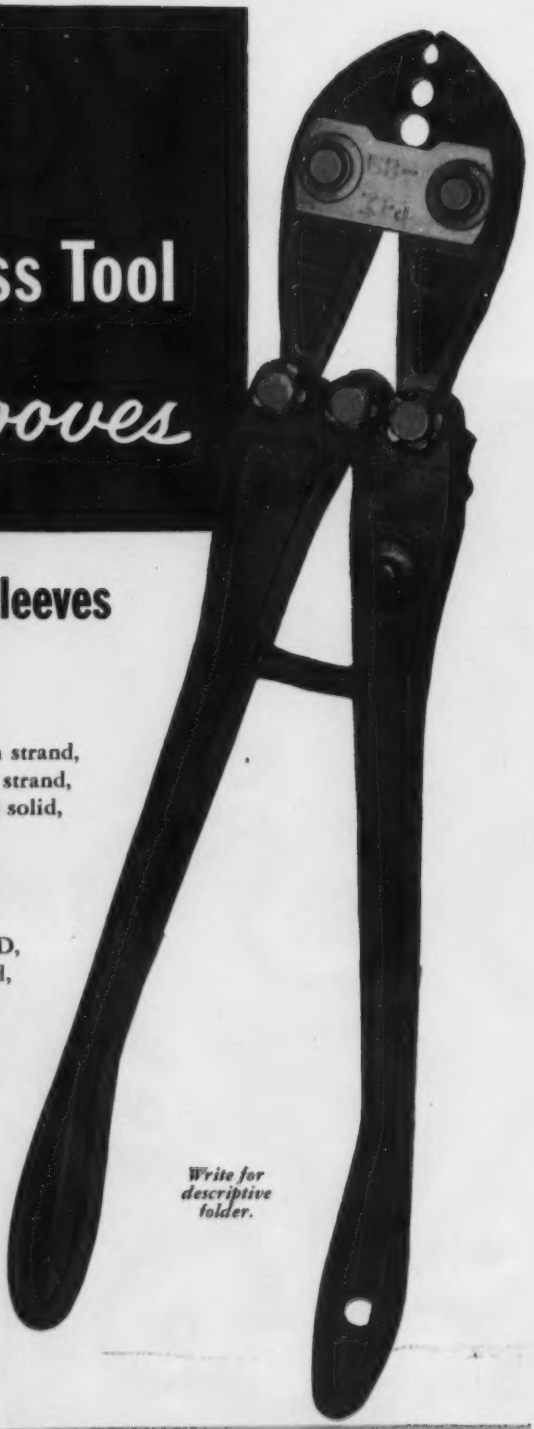
YOU CAN BE SURE...IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

NEW

No. 53-XPJ Nicopress Tool with *Three Grooves*



Accommodates Nicopress Sleeves

FOR COPPER

1 solid, 1 seven strand, 2 solid, 2 seven strand, 2 three strand, 3 solid, 4 solid, 4 seven strand, 4 three strand, 6 solid, 6 seven strand, 8 solid, 8 seven strand, 3 No. 10, 3 No. 8.

FOR COPPERWELD

4A, 6A, 8A, 6C, 8C, 6D, 8D, 9½D, 3 No. 10, 3 No. 12, 4 solid, 6 solid, 8 solid, 10 solid.

FOR ALL-ALUMINUM

2 solid, 2 seven strand, 4 solid, 4 seven strand, 6 solid, 6 seven strand, 8 solid.

FOR AMERDUCTOR

8SCP or SCG, 10SCP or SCG, 12SCP or SCG.

Write for descriptive folder.

Nicopress Sleeves and Tools Patented in U. S. and Foreign Countries. "Nicopress" Registered in U. S. and foreign countries.

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY

The manufacturing of complex electronics equipment, metal fabrication, and machined parts at Production Facilities Co., Miami, Florida, requires a vast array of electric-powered machinery for both laboratory work and production. The power load to run these machines is heavy; so during the plant's construction the best electrical materials available were installed to assure years of reliable service.

For this reason, Spang Conduit was specified exclusively to protect the wiring. SPANGLEAM EMT, with our newly-developed inside and outside finish, is used to run service to the machines. Other parts of the system employ Spang Hot Dipped Galvanized, our lacquered rigid steel conduit with exceptional corrosion-resisting qualities.

There are many reasons why Spang Conduit is specified for so many jobs. Spang Conduit is *quality-controlled* . . . made from the best steel under exacting conditions . . . and thoroughly inspected throughout manufacture to assure you of a *top-quality* product for *top-quality* installations. Spang Conduit is easy to cut, bend and thread . . . and this means faster installation work, saving you time and money.

Whether you specify Spang Hot Dipped Galvanized, Spang Black or SPANGLEAM EMT, you'll always get better conduit when you select Spang. Write for complete information and for the name of your nearest Spang Distributor.

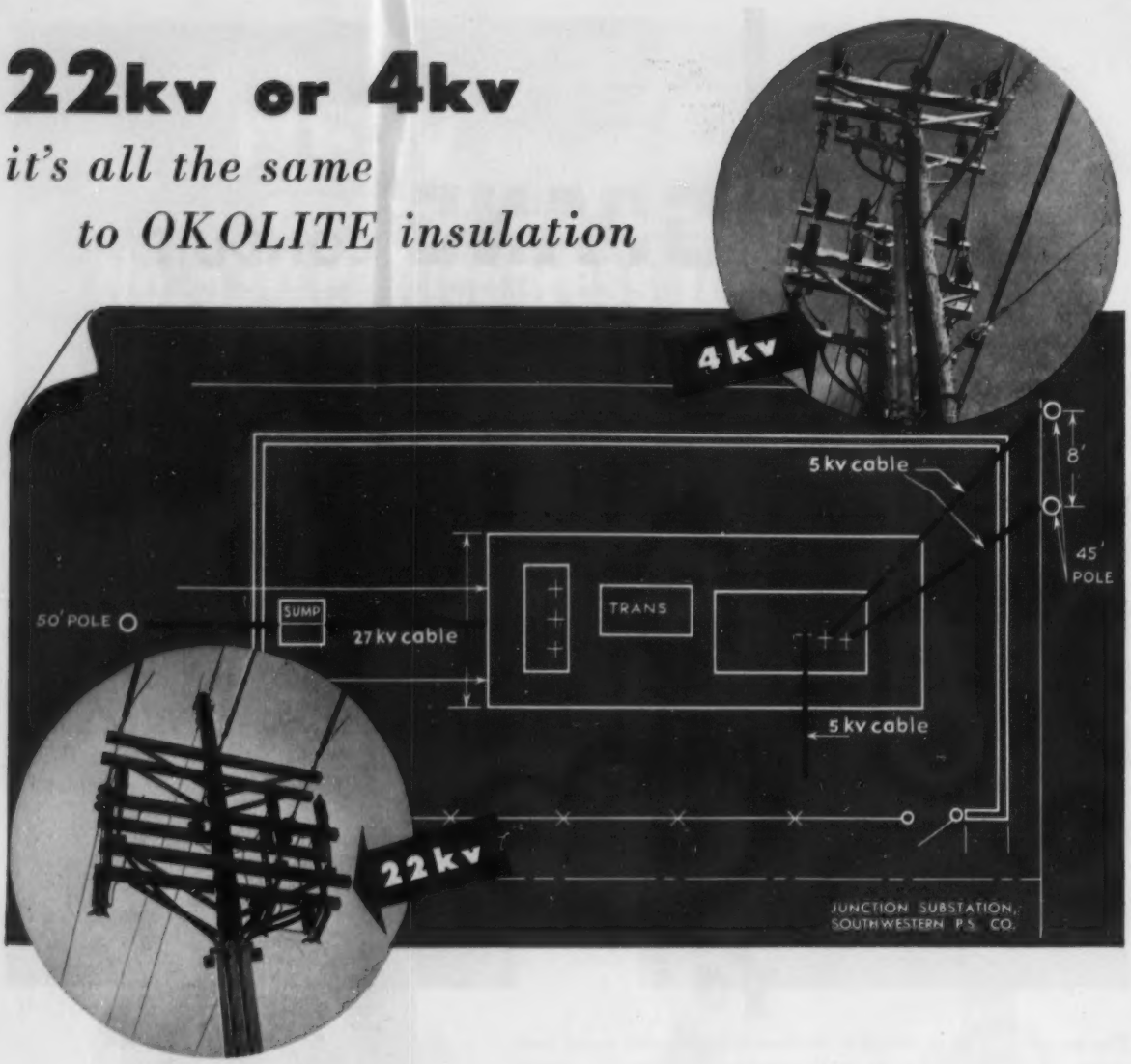
Owner: Production Facilities Co., Inc., Miami, Florida
Architect: Earl V. Wolfe, Coral Gables, Florida
General Contractor: Lyle Roberts, Inc., Coral Gables, Florida
Electrical Contractor: Max Belin, Miami, Florida
Spang Distributor: Westinghouse Electric Supply Co., Miami, Florida

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

22kv or 4kv

it's all the same to OKOLITE insulation



High voltage or low voltage—Okolite rubber insulation provides maximum dependability and utmost safety. Here at the Junction Substation of the Southwestern Public Service Company in Lubbock, Texas, both the 4kv and 22kv circuit risers are Okolite-insulated, Okoprene-sheathed cables.

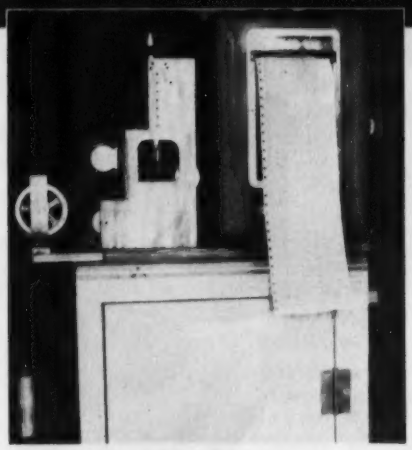
Okolite-Okoprene cables have an outstanding reputation for reliability in circuits up to 35,000 volts. Okolite-Okoprene is easy to handle and cuts installation costs; the problem of oil migration is nonexistent and splices and terminations require less time and labor.

Write today for Okonite's complete handbook on rubber-insulated, high-voltage cables, Bulletin WE-1075. It contains complete engineering and installation information for circuits up to 35,000 volts. The Okonite Company, Passaic, N. J.

OKONITE insulated cables

2304

PELTON GOVERNOR
for Nimbus Powerplant



EXCEEDS SPECIFICATIONS

In a series of notarized performance tests, under simulated powerplant conditions, this Pelton Governor designed for Nimbus Dam, *exceeded* contract specifications. The exhaustive examination under load changes, frequency deviation and variations in speed droop showed conclusively that the sensitivity of the speed response element, as well as over-all governor characteristics will *more* than meet the job.

PELTON PRE-TESTED PERFORMANCE is an integral part of every Pelton product. In addition to governors, we design, build and install large hydraulic turbines, valves of almost every type and size, and related special-purpose equipment. For bulletins and information, address THE PELTON WATER WHEEL COMPANY, 2929 Nineteenth Street, San Francisco 10, California. *Subsidiary of Baldwin-Lima-Hamilton-Corporation.*

ENGINEERS * DESIGNERS * BUILDERS

THE PELTON WATER WHEEL COMPANY

Nimbus Dam on the American River is scheduled for completion this fall, to be followed by the installation of power facilities. The Pelton Type B Governor has a wicket gate capacity of 126,000 ft. lbs. and a Kaplan blade capacity of 87,500 ft. lbs.

Does your regulator meet the test?

Compare
FOR YOURSELF

Thirty days of free examination: that's how Allis-Chalmers helps you decide which regulator is best for your system. Any recognized distribution system can get an Allis-Chalmers distribution regulator completely free of charge for testing. Call in your engineers, purchasing people, operating and maintenance men and let them see for themselves which regulator is best. Compare all the features.

Compare the Control, Too

For example, *Feather-Touch* controls on Allis-Chalmers regulators give you ± 1 volt band, Class I accuracy. No wonder users report revenues increasing, profits up on lines with A-C distribution regulators. Friction can never upset this control because the floating beam of the regulating relay completely eliminates mechanical bearings.

Simple Service

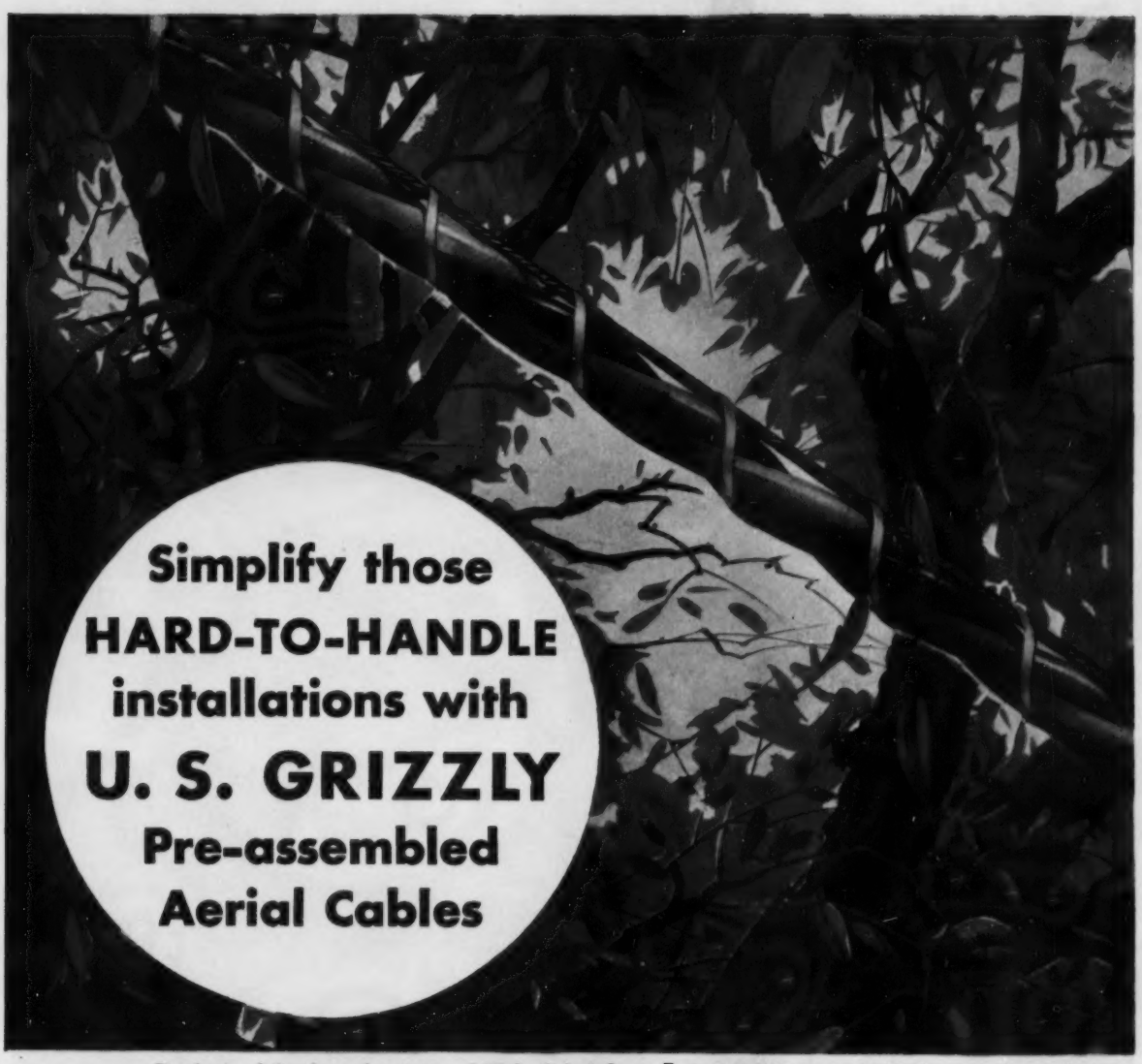
Feather-Touch controls also offer a good example of the simple service requirements on A-C distribution regulators. To remove and replace the control all you do is pull a single jack plug. Your linemen don't have to be technical experts because controls can be returned to a central location for checkup.

Get complete information. Better yet, get a regulator you can test for yourself. Call your nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin, for a test regulator and for the recently published "regulator check list" that will help you analyze all regulators.

A-4356

ALLIS-CHALMERS
ORIGINATORS OF 5/8% STEP REGULATION

A-C ALLIS-CHALMERS



Simplify those HARD-TO-HANDLE installations with U. S. GRIZZLY Pre-assembled Aerial Cables

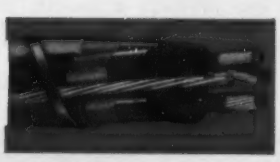
Check the following advantages of U.S. Grizzly® Pre-assembled aerial cables over ordinary open-wiring installations.

1. Less tree trimming is required, and therefore is less objectionable to the community. Can usually be installed in a more direct route.

2. Longer spans and fewer poles due to messenger's great strength.

3. Better appearance because of the elimination of cross-arms and less congestion at the poles.

4. Better service continuity because of high strength supporting messenger.



U. S. Grizzly pre-assembled aerial cable, 15,000 volts. Type RR —3 conductor, Uskorona® ozone-resistant insulation — shielded — Neoprene jacket.

5. Better voltage regulation because the conductors are bound closer together.

6. Lower installation and maintenance costs.

7. Permits shorter poles.

8. Made by United States Rubber Company, specialists in electrical insulation, the only electrical wire and cable producer to grow its own natural rubber, make its own synthetic rubber and manufacture its own plastics.

For more information, write to address below.

FREE BOOKLET
Write for your copy of free booklet giving full information about U. S. Electrical Wires and Cables for the Electric Utility Industry.

US RUBBER

UNITED STATES RUBBER COMPANY

Electrical Wire and Cable Department • Rockefeller Center, New York 20, N. Y.

WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Youngstown

QUALITY V YOUNGSTOWN SERVICE

● Youngstown Buckeye Rigid Steel Conduit is the safe raceway. It is approved by the National Electrical Code for all hazardous locations. In addition it is safe and sure to work with—easy to bend, and erect. Enamel does not chip. Thus Buckeye provides a smooth, continuous raceway for fast, trouble-free running or withdrawal of wires.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

Another reason why
UTILITIES EXPECT MORE FROM **POWERS** *American*

The Ultimate in Line Construction Equipment

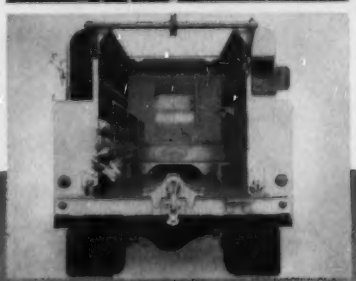
MANAGEMENT
likes the 800-C because it saves man-hours—furnishes crew comfort—provides a safe, durable, low-upkeep unit for heavy work.

SUPERVISORS
like the 800-C because it's a completely equipped body that's easy to load—easy to use—easy to inventory.

CREW MEMBERS
like the 800-C because it keeps tools and supplies in easy-to-find order. And, with a Pole-Master it's a lineman's dream.

All shelves and parts bins are standard equipment. Street-side doors open 180° for easy access to all compartment space.

Sliding drawers are furnished in curb-side compartments. All door locks are keyed alike. Crew enclosure seats four.



56" wide cargo area provides space for miscellaneous supplies. The body can be equipped to meet individual needs.

Utility operators indicate that the 800-C is destined to set a new standard for line construction vehicles.

It furnishes the storage space—the crew facilities—and the equipment for handling the most rugged types of routine or emergency line work. And, when equipped with a *Pole-Master* fully-powered, live-boom derrick—as shown above—crews can set poles up to 75 ft. in length.

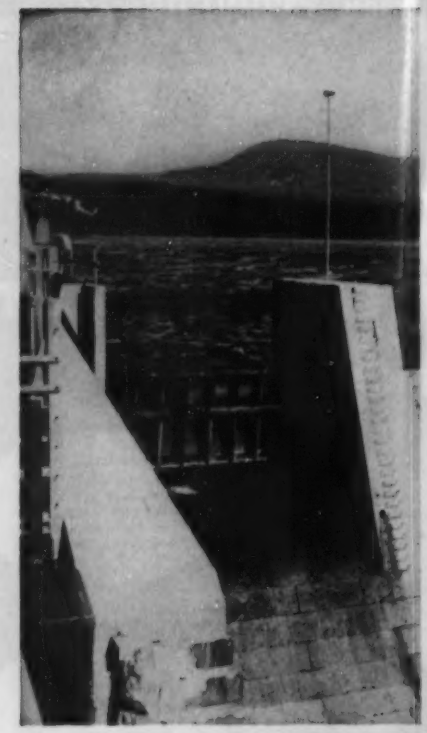
The Series 800-C in 11′, 12′3″, and 13′ lengths—and the Series 800 (without crew enclosure) in 11′ or 12′6″ lengths—can be furnished with *Pole-Master* or conventional derrick.

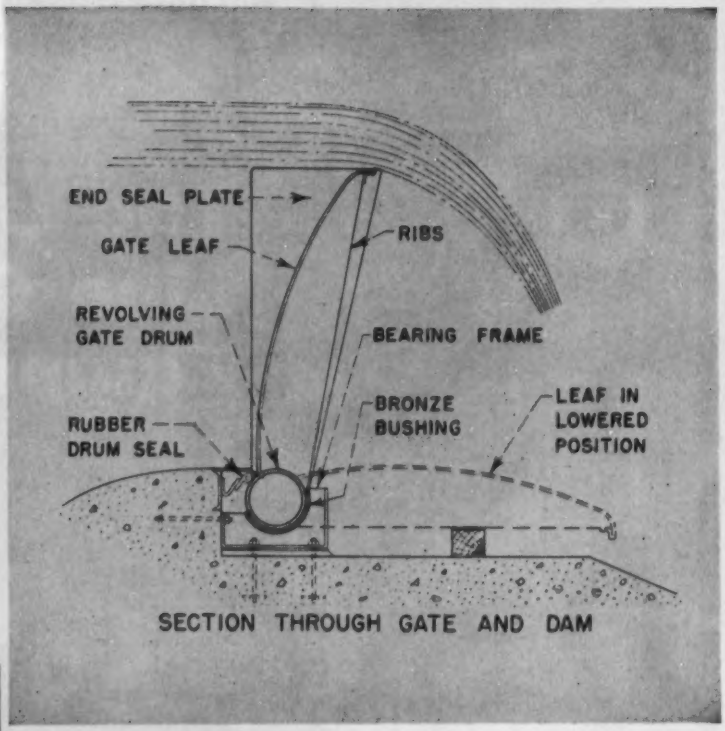
COMPLETE DETAILS and prices are yours for the asking.

Powers-American Division

McCABE-POWERS AUTO BODY COMPANY

5909 NO. BROADWAY · ST. LOUIS 15, MO. 428 LATHAM SQ. BLDG. · OAKLAND 12, CALIF.





SMS

BASCULE CREST GATES

DO YOU NEED MORE WATER STORAGE— MORE CONTROL OR SPILLWAY CAPACITY...

Raising the water level is often the most economical way to meet increased demands on water and power supply. This problem can be quickly and economically solved on existing dams with a Bascule Crest Gate. Advantages of the SMS-Bascule are the speed and ease of operation for flood control and for sluicing away debris and ice.

SMS-Bascule Gates are electrically or hydraulically operated by automatic and/or manual controls.

According to your needs, gates can be made in lengths up to 100 ft. and up to 10 ft. in height.

Hydrodynamics has been our specialty for over 75 years. For more information on hydraulic turbines, bascule gates and other accessories, write to the S .Morgan Smith Company, York, Pennsylvania.

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Pumps
Gates & Hoists
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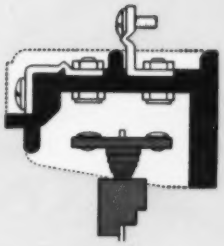
Free-Discharge Valves
Controllable-Pitch Ship Propellers

S. MORGAN SMITH CO.

Bulletin 709 Starters are SO TROUBLE FREE

••• ••• *because they are* SO SIMPLE

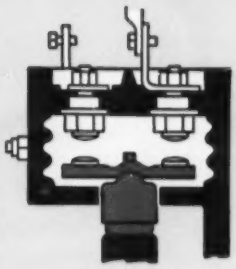
DOUBLE BREAK, SILVER ALLOY CONTACTS—NO MAINTENANCE



SIZES 0 & 1

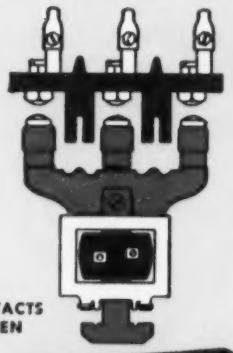
Some 20 years ago, when Allen-Bradley announced the new Bulletin 709 solenoid starter, a big feature was the change from single break, copper-to-copper contacts to double break, silver alloy contacts. A warning on the name plate said: DO NOT FILE, CLEAN, OR DRESS CONTACTS.

At first, maintenance electricians paid little attention to this request. Who had ever heard of running motor starters without contact maintenance? But, today, the dependability of Allen-Bradley starters is taken for granted. They have proved they are good for millions of trouble-free switching operations.



SIZES 2 TO 7

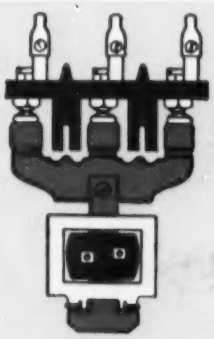
ONLY ONE MOVING PART—NOTHING TO RUST AND STICK



CONTACTS OPEN

The Allen-Bradley solenoid starter design was new and revolutionary in 1934. By doing away with clapper contactors, it eliminated hinged linkages, pivots, pins, and bearings. Only one moving part . . . the one-piece solenoid plunger . . . opens and closes the contacts with a simple up-and-down motion. Such simplicity assures unfailing operation.

Today, millions of Allen-Bradley solenoid relays, contactors, and switches are in active use. They have set a standard of performance which has expanded the use of automatic controls. Allen-Bradley solenoid controls sustain almost unbelievable production records. Look for the A-B trademark. It means QUALITY in motor control.



CONTACTS CLOSED

Under the same operating conditions a machine with many moving parts is more likely to develop trouble than a simpler machine with fewer moving parts.

The same rule holds true for motor starters. Most starters have complicated linkages, bearings, hinges, pins, and pivots in their mechanisms. Each moving part is a potential troublemaker.

Allen-Bradley Bulletin 709 magnetic starters are SIMPLE—they have ONLY ONE MOVING PART. If you want maintenance free motor controls . . . specify Allen-Bradley. Let us send you the latest A-B information—the A-B Handy Catalog.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

Bulletin 709 starters: Sizes 0 to 4. Sizes 5 to 7 not shown. Max Rating: 300 hp, 220v; 600 hp, 440-550v.

ALLEN-BRADLEY

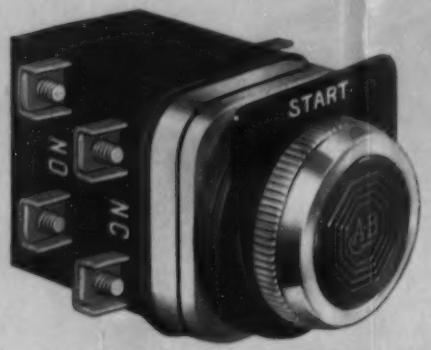
TROUBLE-FREE MOTOR CONTROLS

QUALITY

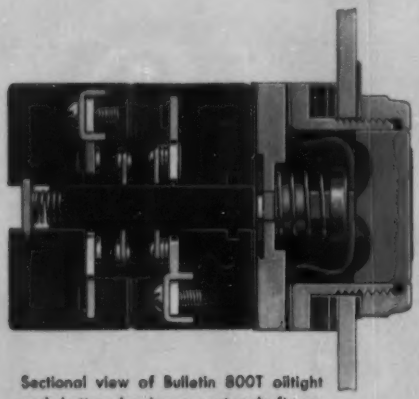
A-B Quality

B-84-M

OILTIGHT PUSH BUTTONS



Start Button with Double Pole NC and NO Contacts



Sectional view of Bulletin 800T oiltight push button showing operator shaft carrying moving contacts. Stationary contacts are mounted in the molded contact block. The oiltight flexible diaphragm is between push button and contact block.

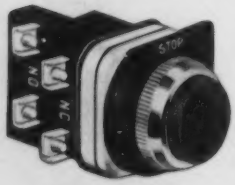
Assemble any combination of operators and contact blocks

OPERATORS

CONTACT BLOCKS

Bulletin 800T operators and contact blocks are available in many forms. They may be assembled interchangeably in various combinations, thus reducing your motor control parts inventory.

Here are a few of the many Allen-Bradley oiltight pilot units for machine tool service. They are available for mounting on machine frames in a variety of single units or in any combination of one or more units in oiltight enclosures. A flexible diaphragm, not affected by oil or cutting fluids, is inserted between button and contact block (see diagram at left) to prevent oil seepage into the contacts.



Type BA Stop Button

The silver alloy contacts are maintenance free. For complete information on the Bulletin 800T line, send for the new Allen-Bradley Handy Catalog.

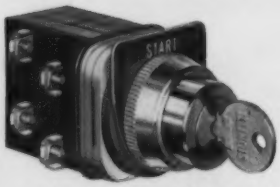
Allen-Bradley Co.
1316 S. Second St.
Milwaukee 4, Wis.

Type H2B Selector Switch

Type K2B Jog Button

Type 6PX Pendent Control

Bulletin 800T Type 2TA in Two-button Oiltight Enclosure



Type E11B Cylinder Lock Button

Type P26 Pilot Light

A-B

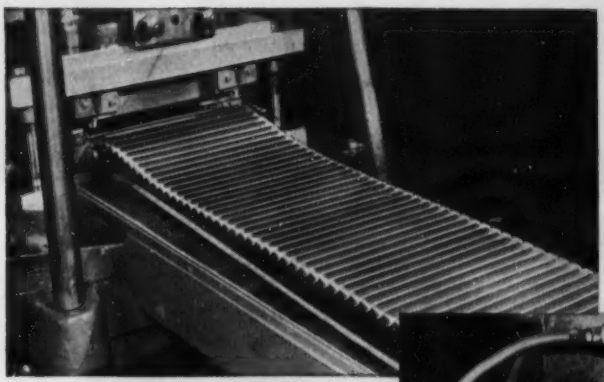
ALLEN-BRADLEY

QUALITY

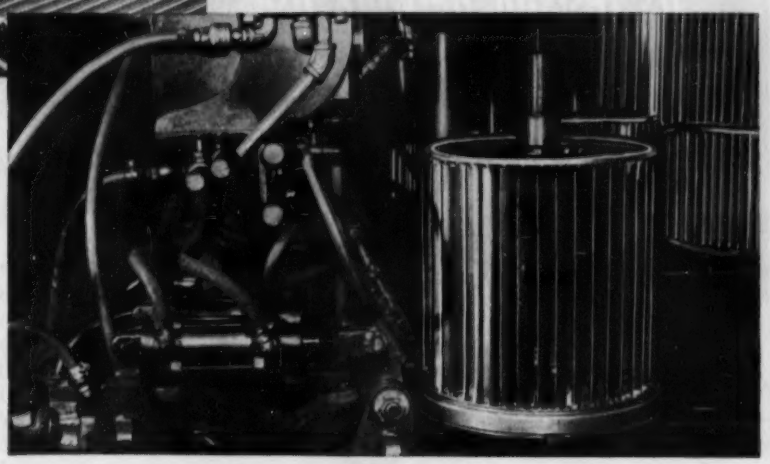
MOTOR CONTROL

8-56-M

Utility Appliance Corp. makes evaporative coolers from USS Steel Sheets



Making corner posts for evaporative coolers out of 22 gauge galvanized steel (see photo above left) is a five-step operation at Utility Appliance Corp., Los Angeles, Calif. A 90-ton V&O punches out blades for blower wheels (left) from a continuous coil of 20 gauge cold rolled strip. At full capacity, this plant produces approximately 5000 coolers per week in several different sizes, also makes water heaters, furnaces, heavy duty blowers and modern gas ranges to suit a variety of applications.



Spot welding of blower wheels is done on this semi-automatic set-up designed by Utility Appliance Corp. The ends of blower wheels are 18 gauge cold rolled sheet; blades are 20 gauge strip. This company reports: "We like USS Steel Sheets because they're always uniform high quality ...with perfect temper and gauge. In addition, we get good service and dependable delivery."

Mr. Tom Northcote, Sales Manager of the Cooler Division of Utility Appliance Corp., inspects one of the completed Utility Air Coolers. The finished product is just one of many examples of United States Steel at work. From start to finish... from open hearth to rolling mill to final product... steel from USS is designed to do the best job for you. For full information or technical assistance, contact your nearest Columbia-Geneva District Sales office.

Free!

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Columbia-Geneva Steel Division EW-9.
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Please send me your free wall chart showing weights, standard sizes, and gauges of Steel Sheets.

*Name*_____

*Address*_____

*City*_____ *State*_____

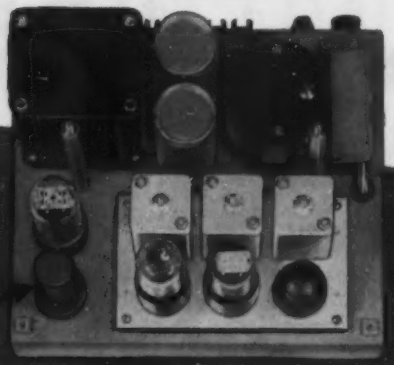
USS

USS Steel Sheets

United States Steel Corporation · Columbia-Geneva Steel Division

UNITED STATES STEEL

New WESTON Inductronic® D-C AMPLIFIER Measures Millivolts to 0.1%!...



The new Weston Inductronic D-C Amplifier measures both millivolts and microamperes to an accuracy previously unheard of. A product of Weston Electrical Instrument Corp., Newark, N. J.

Its resistor network uses D-H ALLOY to assure HIGH STABILITY and ACCURACY

The Weston Resistance Network (Actual size) is wound with D-H Manganin wire to achieve a high degree of stability with extreme accuracy.

When it's millivolts or microamperes you are measuring, you talk in terms of accuracy in the order of 0.1%. Here is the most accurate measuring instrument yet developed — the Weston Inductronic D-C Amplifier. This amazing instrument makes potential measurements down to microvolts, current measurements to fractions of a microampere.

By using this 200 kc frequency shift amplifier in connection with thermocouples, radiation receivers, bolometers, strain gages, pressure transducers, resistance thermometers, photocells, ionization gages, etc., related physical quantities can be measured with speed and accuracy far superior to any other method previously known.

The amplifying system is essentially an automatic potentiometer, wherein an output current is maintained in balance against the input through a method of accurately adjusted resistors determining the balanced ratio of output to input. With a high gain in the amplification of error unbalance, the accuracy of amplification ratio is of course dependent almost entirely upon the *stability* and *precision* of the resistor network.

For this most exacting function Weston uses Driver-Harris MANGANIN, an alloy of such fixed stability that maximum change in resistance between 15°C. and 35°C. is less than *15 parts per million per degree Centigrade.*

If fixed stability and constant resistance under normally variable operating conditions are "musts" in *your* resistor designs, let us have your specifications. We'll gladly put at your disposal 50 years of alloy manufacturing experience to help solve your problem.

*Sole producers of world-famous Nichrome**

Driver-Harris Company

Western Representative: **ANGUS-CAMPBELL, INC.**

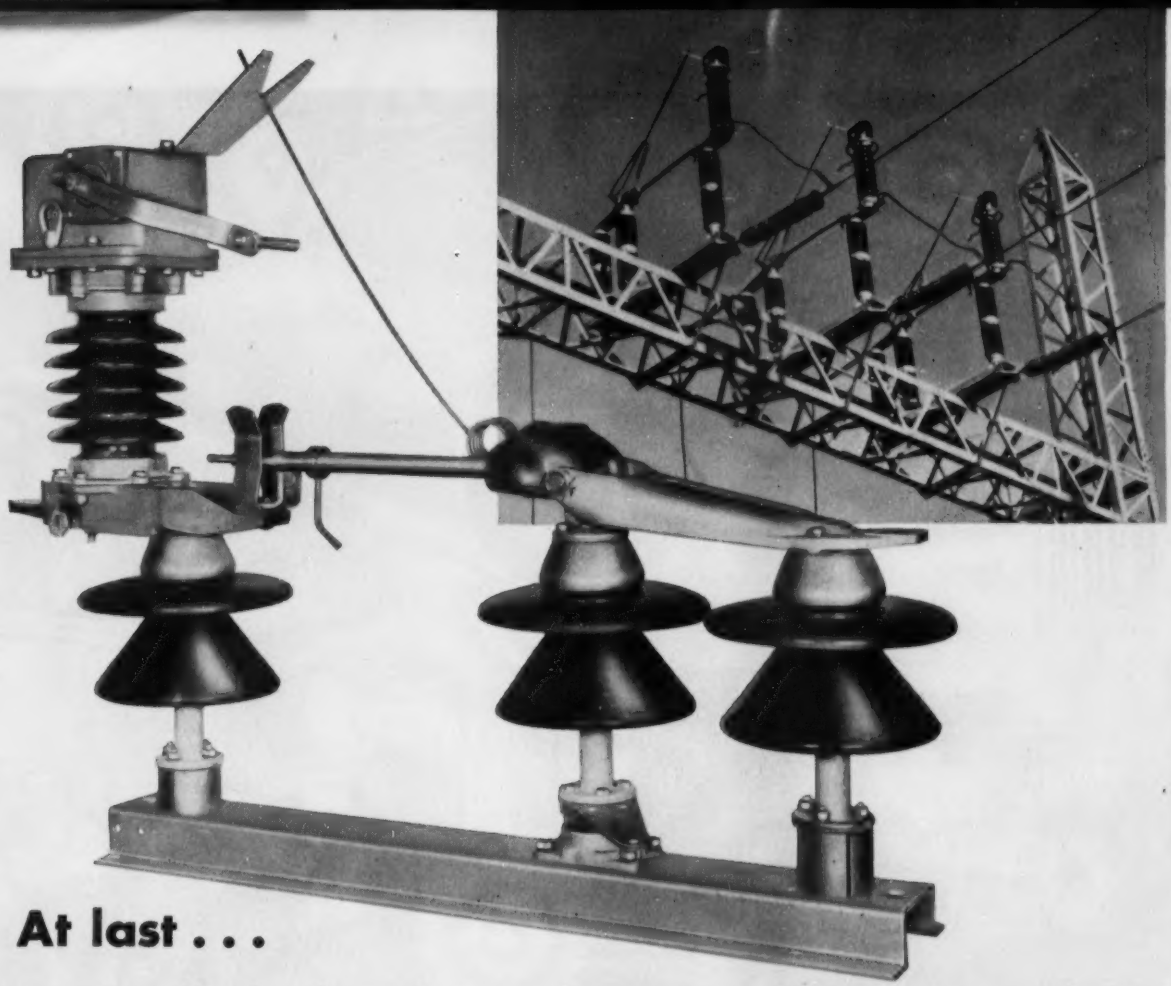
5320 Santa Fe Ave., Los Angeles 58 917 Bryant St., San Francisco 3

Main Office and Plant: HARRISON, NEW JERSEY

*T.M. Reg. U.S. Pat. Off.

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

Visit Driver-Harris at the Philadelphia Instrument Show Booths 501-503



At last . . .

a switch that interrupts load current safely!

Exclusive Westinghouse VLB Switch can reduce switching costs—Now you can use the inexpensive Westinghouse VLB Switch to interrupt load currents on high-voltage transmission lines. The arc is completely enclosed so that it *cannot* develop into a system fault—a distinct possibility if horn-gap switches are used for interrupting duty (a job for which they're not designed).

Interrupts 600 amps—The VLB interrupts line-charging current, transformer magnetizing current or up to 600 amps of load current. Dependable performance under all these conditions provides the basis for interrupting rating.

New interrupter—The problem in designing the VLB Switch was to develop a small but effective interrupter to add to the standard air break switch. It was solved by using a gas, sulfur hexafluoride, which has exceptional arc-extinguishing properties.

No gas loss—This switch may be operated like a conventional disconnecting switch. When the main blade is raised, the current is carried through the interrupter. The blade engages an arm on the interrupter unit which trips a toggle and snaps open the contacts. The interrupter is hermetically-sealed and no gas is consumed during operation, nor does it deteriorate.

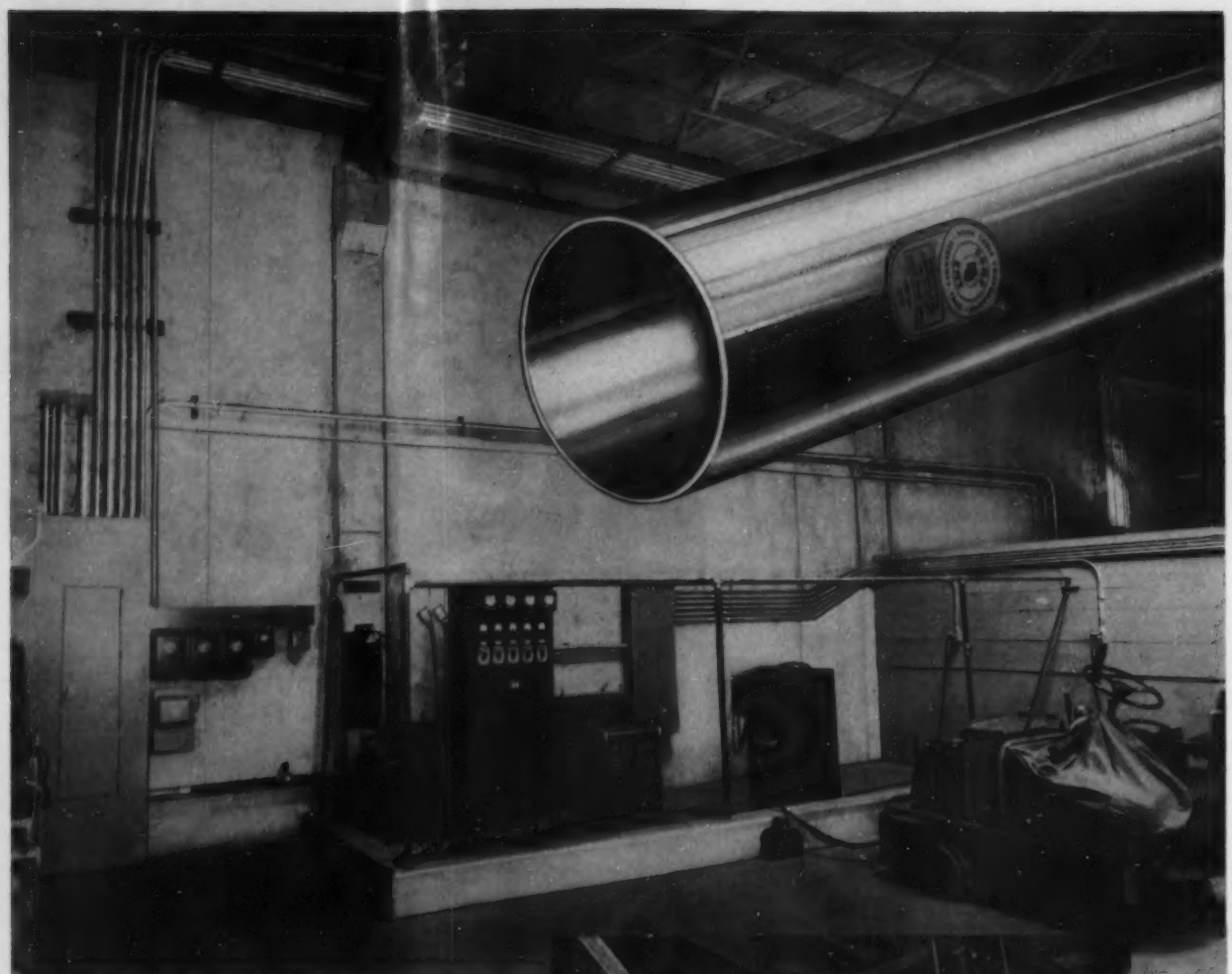
Thoroughly tested—Exhaustive laboratory tests of the VLB show that it is a NEMA Class A device and will operate 500 times without maintenance. Field tests have confirmed laboratory findings.

Replaces air switches—The new switch is available in ratings from 7.5 to 115 kv (138 kv effectively grounded). It can replace existing air switches. Write now for descriptive information on this new device that makes an air break switch do what you have always wanted. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60847

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver



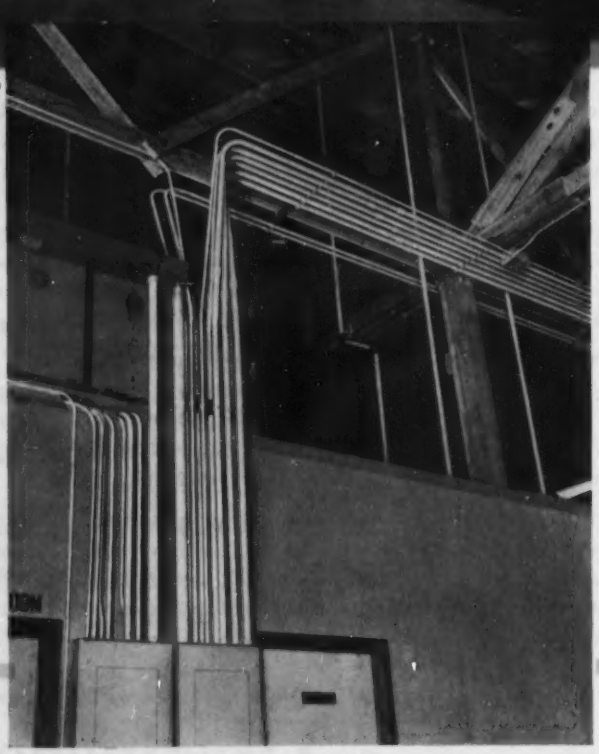
Installation: General Services Administration Warehouse, San Francisco
Electrical Contractor: Charles B. Farrow, San Francisco

Upper runs of Rome • EMT carry wires and cables from main distribution panels and feeders to subpanels for lighting and conveyor systems. Lower runs carry distribution cables to battery-charging outlets from the main charging panel (lower foreground). Rome • EMT protects other wires and cables going from the lighting distribution panel to serve the warehouse office and truck entrance.

Rome • EMT is now available in the following sizes: STRAIGHT LENGTHS—½", ¾", 1", 1¼", 1½" and 2". 90° ELBOWS—¾", 1", 1¼", 1½" and 2".

Warehouse stocks located as follows:

San Francisco, Calif.	Los Angeles, Calif.
Chicago, Ill.	Salt Lake City, Utah
Dallas, Texas	Seattle, Wash.
Denver, Colo.	St. Paul, Minn.
Torrance, Calif.	



Do It Better—Do It Electrically
National Electrical Week, October 18-25

For unexcelled wire and cable performance:

RoZone® | **RoLene**
ReMarine | **RoFlex**
RoPrene® | **RoBarn**
Rome Synthinol®

You get Positive protection at substantial savings with Rome·EMT

Installation of Rome·EMT in the New General Services Administration Warehouse in San Francisco is another instance of its wide acceptance in the West.

In factories, generating plants, apartments, institutions, stores and office buildings, Rome·EMT provides safe and positively protected electrical installations. Electrically welded, it has unusual strength, while its electro-galvanized surface, uniformly coated with zinc, assures long-time resistance to corrosion. The mirror-smooth interior surface, absolutely free of burrs and rough edges, prevents cable injury and facilitates fishing and pulling. Precision manufacture assures uniform diameter and wall thickness.

Low installation cost is the great plus feature of Rome·EMT. Light in weight, it's easy to handle and bend—keeps costly man-hours at a minimum. Simple compression-type fittings assure quick, moisture-tight seals, without time-consuming threading.

It's easy to see why Rome·EMT is being specified for so many big wiring jobs. It's simple to install. It's *safe* to install. Fully approved by Underwriters' Laboratories, Inc., it meets all standards for thin-wall raceway!

You'll find that the quality, dependability and economy of Rome·EMT also extends to the entire Rome line of wire and cable. Whatever your requirements, your nearby Rome Cable office will be glad to help you in planning for them.

It Costs Less to Buy the Best

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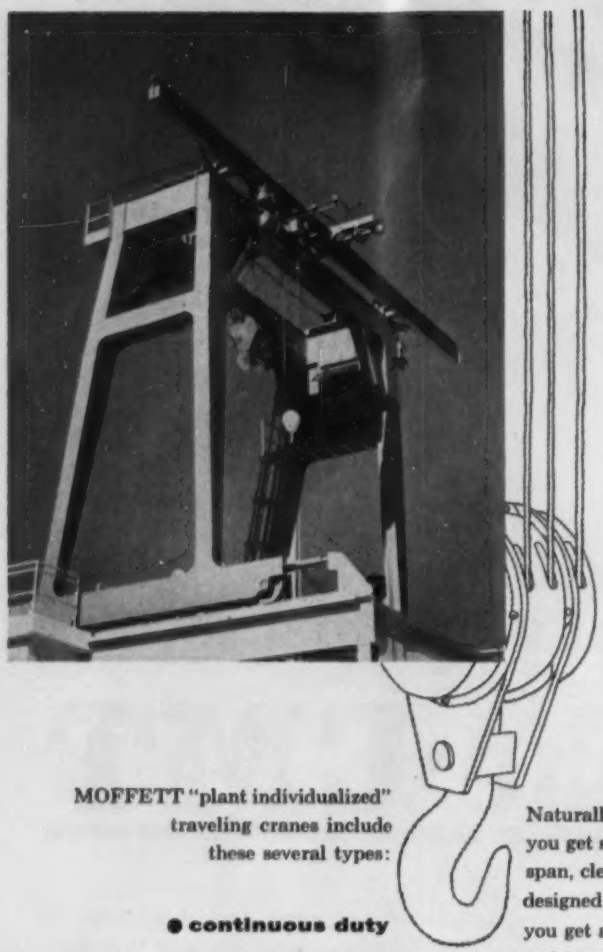

MOFFETT gantry crane, built and erected for Bechtel Corporation, engineers and constructors, at new, modern Kyrene Steam Plant, Salt River Power District, Arizona. Main hoist, 30 tons capacity; 10-ton auxiliary hoist on monorail outrigger.

Contracting for an overhead crane? consult MOFFETT

1/4 to 650 TONS

MOFFETT "plant individualized" traveling cranes include these several types:

- **continuous duty**
- **heavy industrial duty**
- **intermittent duty**
- **powerhouse**
- **standby**
- **steel mill**
- **gantry**
- **special purpose**

Naturally, in each MOFFETT installation you get safety and reliability. Travel and hoist speeds, capacity, span, clearances, type of power and controls, cab, etc. are designed to fit the job—your job. In short, you get a crane "individualized" to your contract specifications and in most cases, at standard model prices.

You get quick, personal service, too . . . coordinated with your erection schedules . . . because the engineers designing your crane work directly with you—there's no long chain of intermediaries, no red tape. Erection goes quickly and smoothly . . . contractors tell us MOFFETT cranes are the easiest to erect.

Why settle for less than a "plant individualized" crane? Write TODAY for 32-page booklet showing MOFFETT crane installations. Also for our Crane Inquiry Form, listing factors you need to consider in preparing your crane specifications. No obligation. Phone, wire or write NOW.

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10,000 Tons of Proof . . . in the last three years alone, we have built more than 150 cranes, handling loads of 1/4 to 650 tons with an aggregate capacity of 10,000 tons for such leaders as:

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EAST BAY MUNICIPAL UTILITY DISTRICT
GIBBS & COX, INC.
KAISER ENGINEERS
PETER KIEWIT SONS' CO.
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EXPORT: PHILIPS EXPORT COMPANY

54-2

PRODUCT NEWS

Lighting, Noise Reduction Combined

(1) Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

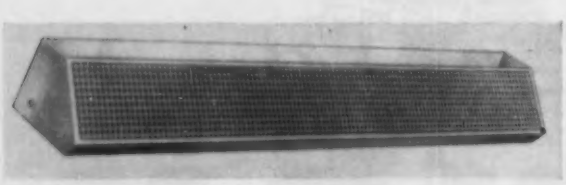
Designed for use where sound control and modern lighting are desirable but budget does not allow separate installations, the Sono-Lume fluorescent system is said to have sound-conditioning built in.

The new fixture's sound control element consists of perforated steel wings behind which are installed blankets of preformed glass fibers. Based on acoustic laboratory tests, each 4-ft unit absorbs as much sound as 10 sq ft of a ceiling soundproofed with material having the same noise reduction rating as the new fixture, the manufacturer states.

To assure maximum sound absorption, installation in continuous rows only, with a maximum center-to-center space of 6 ft, is advised by the manufacturer.

These fixtures are available in 4- or 8-ft lengths, with all-plastic shielding for completely diffused illumination or a louver assembly having a 35° crosswise and 45° lengthwise shielding. All light reflecting metal surfaces are treated and finished to assure minimum reflectance of 86%, it is stated.

Fixtures are surface mounted to the ceiling with the two mounting brackets furnished and fastened in rows for continuous wiring. They use preheat, instant or rapid start series ballasts. These units bear the UL and ETL labels.



Cove Lighting

(2) Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Mo.

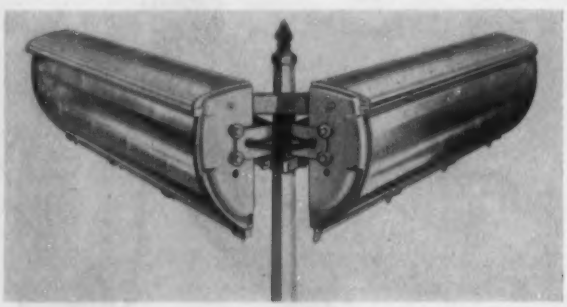
For use as a cove indirect or a direct down light, the 2-in-1 mounts either way without extra gadgets or change in the fixture, its manufacturer states. As a cove it beams 80% of the light directly upward and outward, 20% downward to brighten side walls. When the fixture is used as a down light, the distribution is reversed. The manufacturer's Grate Lite louver-diffuser provides shielding in the 45° to 90° zones.

Control for F Lighting

(3) General Electric Lamp Division, Nela Park, Cleveland 12, Ohio

A simplified low-cost method for regulating the brightness of fluorescent lamps has been announced by this manufacturer. The dimmer will control the light output of up to twenty 40-w rapid-start F lamps at one time and supplements a more complex electronic control device introduced in 1952 for control of a larger number of lamps.

The new system employs an electrical control device, of the type commonly available for dimming incandescent lamps or regulating speed of motors, in combination with a special rapid-start ballast.



Street Lighting Unit

(4) Line Material Co., Milwaukee 1, Wis.

A new unit in this manufacturer's line is a four-lamp v-shaped fluorescent luminaire for 6-ft lamps. It provides a type IV distribution pattern and is designed for street lighting applications at a mounting height of 25 ft or higher. It is claimed to have a brightness of one-twentieth that of conventional small source luminaires having similar light distribution.

Two lamps are housed in each leg of the v-shaped unit, said to be particularly adaptable for wide streets. One ballast furnishes power to each leg of the v, or one lamp in each leg may be interconnected to a single ballast. Terminal blocks inside each leg facilitate connections.

All metal parts are aluminum, with the exception of nonferrous fittings. The cover is a translucent plastic, which is hinged at the top and latched at the bottom for easy connection, relamping and maintenance. Cover gaskets make the unit weatherproof and bugproof, the manufacturer states.

Fill in the Coupon on Page 66

SQUARE D *Reduced Voltage* STARTERS

One of these 4 types will meet your requirements . . . best

- Is minimum motor current inrush your primary consideration?
- Is it reduced starting torque? Or maximum smoothness in acceleration?
- Is cost an important factor?

With these four types Square D can meet any reduced voltage starter requirement—exactly.

***Write** for Reduced Voltage Starter Bulletins. They give complete details.*
Address Square D Company, 4335 Valley Blvd., Los Angeles 32, California

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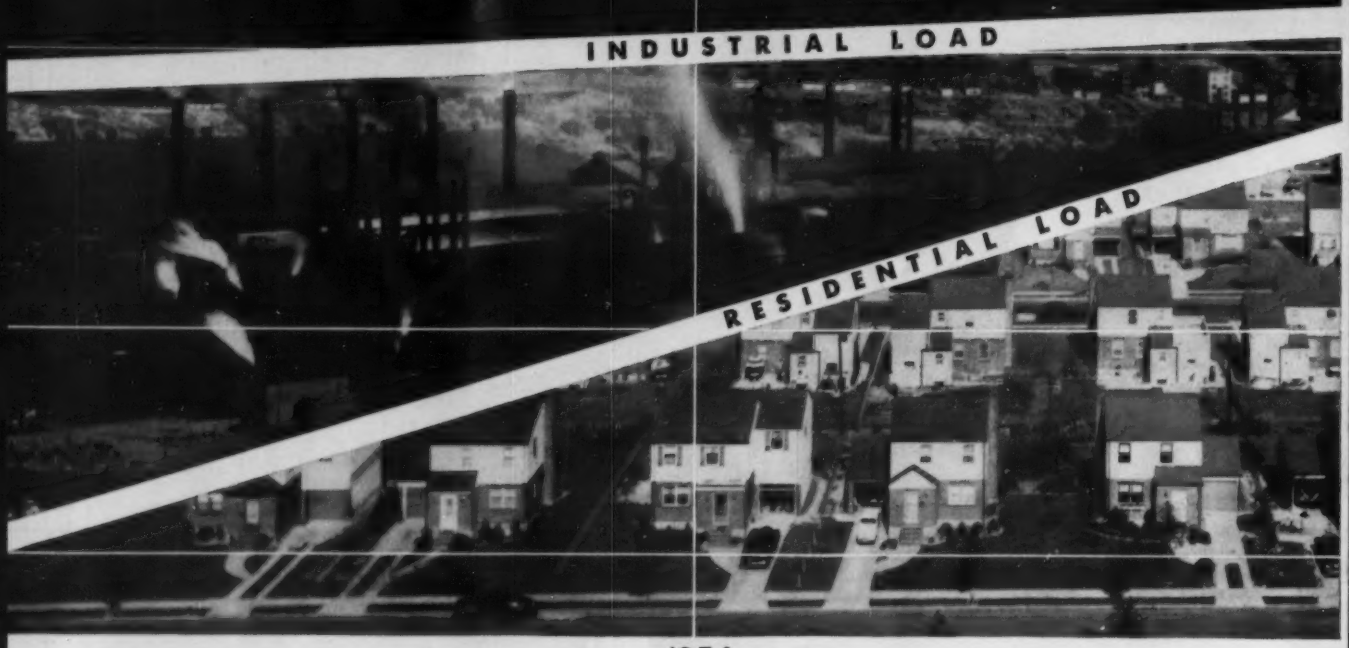


1954

Here's the most economical way

Use G-E Unit Substations to reduce system investment

Add capacity to handle your steadily growing residential market and do it the most economical way with G-E Unit Substations.

No excess investment is needed because you buy no more capacity than is actually required. That means economy today—plus quick and easy expansion to meet the demands of tomorrow.

G-E Unit Substations can simplify the problems of expansion as requirements increase. Advance planning and proper substation selection, for example, permit you to expand a radial system into a network system.

Have capacity available when you need it by ordering G-E Unit Substations in advance on the basis of predicted load growth. Then, when your load grows, select sites where capacity is needed and your substations are ready to be installed.

"How to Reduce System Investment" (Bulletin GEA-5847) will help you plan for economical system expansion. It discusses system planning and reveals how other utilities are handling rapidly growing loads. For your copy, write General Electric Company, Section 512-3, Schenectady 5, N. Y.

Progress Is Our Most Important Product

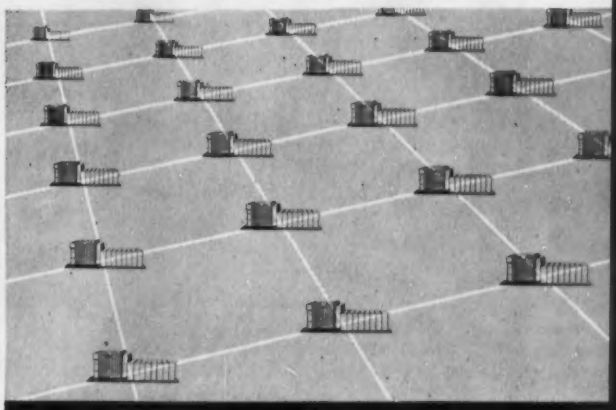
GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

RESIDENTIAL LOAD IS GROWING rapidly, and is expected to equal industrial load by 1973. Utilities can meet their residential distribution demands yet trim system investment by advance planning with G-E Unit Substations.

to grow with your residential load

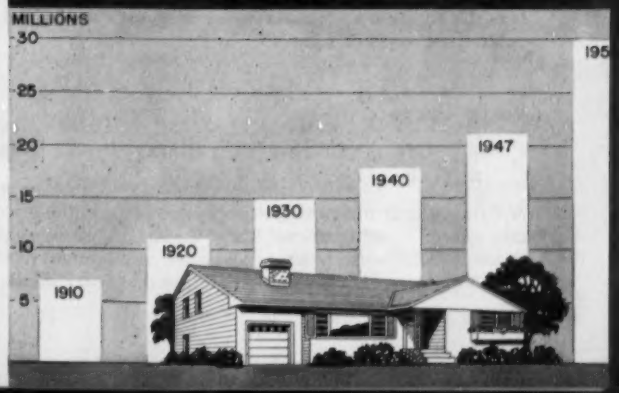
LOCATIONS FOR UNIT SUBSTATIONS are "on the mile every mile" to economically serve residential areas. By properly locating small unit substations for expansion into such a system, utilities can economically grow with increasing demands and provide residential customers with economical power and maximum service continuity.

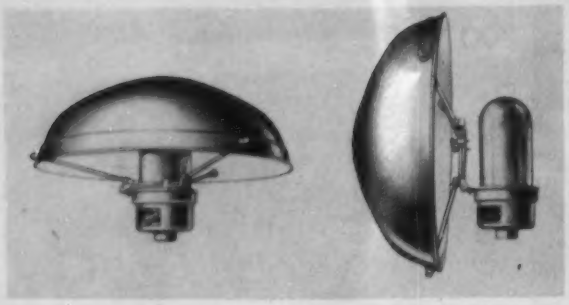


EVERY MILE ON THE MILE

POPULATION GROWTH in the U.S. since 1947 has been 11%—population in the suburbs has grown 43%. Since 1941 the average kilowatt-hours use per residential customer has doubled every 10 years and is expected to double again in the next decade. This fast-growing suburban growth trend has been going on for a long time—is expected to last indefinitely.

HOW THE SUBURBANITES MULTIPLY





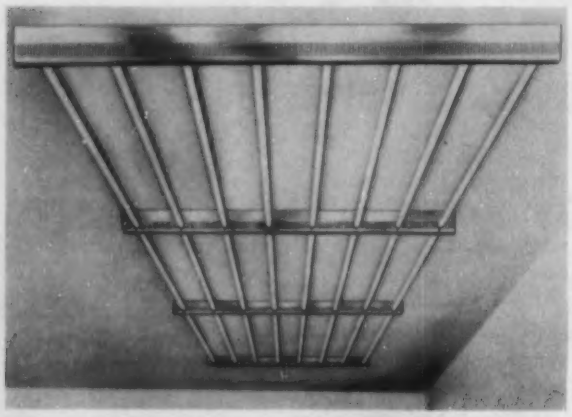
Pedestal Lights

(5) Crouse-Hinds Co., Wolf & 7th North St., Syracuse, N. Y.

A 200-w pedestal lighting fixture, type VPH 4209, is for use where mounting limitations require a bottom rather than overhead feed, such as along tops of fences, walls, fire escapes, outdoor stairways or catwalks.

The fixture, which is pictured above, is vaportight; has a large porcelain enameled steel reflector, which directs light downward. The reflector may be loosened and swung aside for relamping. A 1¼-in. hub allows the use of ordinary conduit as a vertical support, the manufacturer states.

Another new 200-w pedestal fixture, type EVPH 4209, was designed for petroleum refineries; exceeds UL standards for NEC class 1, groups C and D hazardous locations, the manufacturer reports.



Store Lighting

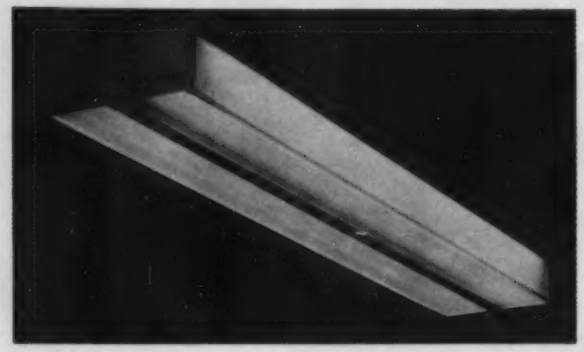
(6) Smithcraft Lighting Division, Chelsea 50, Mass.

Called the Salesliter and designed for slimline lamps, a new lighting system for stores gives the effect of row after row of lamps without lampholders or conventional housings. In addition the units may be laid out continuously to create long lines of light.

Radio Lamp

(7) General Electric Co., Wiring Device Department, Providence 7, R. I.

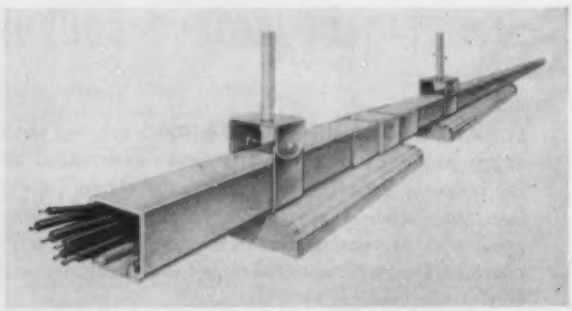
A lighting unit that attaches to table radios is designed to save space. This Monowatt Radio Lamp has an ivory plastic socket with bottom turnknob switch and a metal bracket on which the socket is mounted. The bracket terminates in a clip that can be attached to supporting bases of varying thicknesses and in various positions. Attachment requires no tools and there are no electrical connections to make. In addition to its use with radios, it is suggested that the clip can be attached to planter boxes, small aquariums, the edge of a book cover, decorated trays, book ends, etc.



All-Plastic Fixture

(8) Globe Lighting Products Inc., 2121 S. Main St., Los Angeles, Calif.

In the Challenger, new commercial luminaire series, ribbed plastic sides are interlocked with plastic prismatic lens bottom without metal retaining rails. The lens bottom is extruded of polystyrene and is designed to direct maximum intensity in a straight downward path. Light at oblique angles, which normally would strike the eyes, is refracted below eye level, it is pointed out.



Approved for Raceway

(9) Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.

This manufacturer reports that its channel and fittings, formerly used as support, are now listed by UL for wiring lighting installations as well as for supplementing power wiring of machines, hand tools, motors, other lighting rows, etc. The UL listing applies to channel sizes P-1000, P-2000, P-3000 and P-4000 for wiring up to 600 v. Fittings listed include snap-in closer strip, hanger fittings, end caps and joiner fittings.

Among advantages of this system listed by the manufacturer are saving in installation time; continuous channel support; fact that wire pulling is not necessary because wires are laid in the channel and a closer strip snapped in place. Hanger stems may be placed anywhere along the channel, thus avoiding ceiling obstructions; supplementary lines can be tapped from the channel for other use, it is pointed out. Bulletin FF-3 gives details.

Two Ways To Improve Your Next Explosion-Proof Installation!

KILLARK

Flexible Couplings

. . . for safer wiring in vibration areas

If you're hanging explosion-proof fixtures in an area of excessive vibration, or if you're installing motors that vibrate — then you need Killark Flexible Couplings for the job. They're explosion-proof, won't shake loose, are U. L. approved.

- Base and fittings of solid brass.
- All combinations of hubs.
- Conduit diameter from ⅓" to 2" — any length.

We will make up the particular coupling you want — and get it off to you quickly. Remember, where vibration is worst, Killark Flexible Couplings are best!

KILLARK

GRH Series Explosion-Proof Junction Boxes

. . . for easier wiring on big jobs

Available in big, roomy sizes — up to 11"x12"x7⅓"—but light in weight. That's because they're made of Killark's exclusive Alumalloy, the 20th century metal. Large 9⅝" cover opening allows plenty of convenient hand room for easier wire splicing. Hubs from ½" to 4"—in any position you desire.

XJB
Extra Large Fitting
With bolted cover (26⅓" x 14⅓" x 8") is now available — with hubs in any position.

K KILLARK ST. LOUIS Killark

ELECTRIC MANUFACTURING COMPANY

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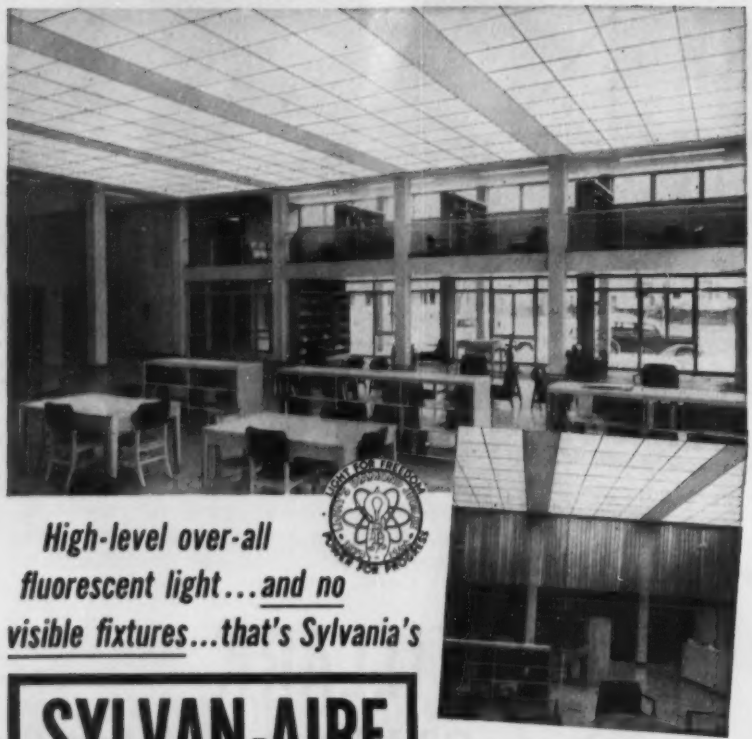
	Chicago	1528 West Adams St.	Los Angeles	412 Seaton St.	Seattle	4130 First Avenue South
SALES OFFICES	Baltimore	11 W. 25th St.	Columbus	2700 E. Main St.	Minneapolis	826 Andrus Bldg.
	Cincinnati	49 Central Ave.	Kansas City, Mo.	616 W. 26th St.	New York	600 W. 181 St.

Here's a New Sylvania
LIGHTING SYSTEM!



High-level over-all fluorescent light...and no visible fixtures...that's Sylvania's

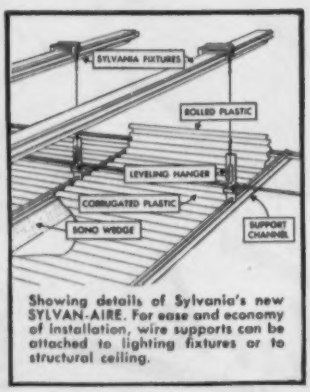
SYLVAN-AIRE

Two views of SYLVAN-AIRE Lighting System in High Point, North Carolina Library.

This SYLVAN-AIRE system actually serves three purposes.

1. It provides a source of soft but ample over-all light.
2. Made of corrugated, translucent plastic, it imparts a new beauty and character to any room.
3. Designed with alternating acoustical strips or wedges to help hold sound to comfortable levels.

Quick, easy installation and extremely low maintenance costs are other big advantages. For new descriptive literature write to Dept. 4X-2609 at Sylvania.



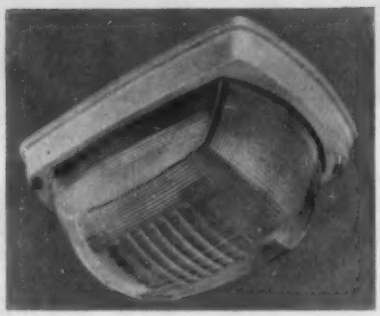
Showing details of Sylvania's new SYLVAN-AIRE. For ease and economy of installation, wire supports can be attached to lighting fixtures or to structural ceiling.

SYLVANIA

On the West Coast—215 Market St., San Francisco 5, Calif.

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

LIGHTING • RADIO • ELECTRONICS • TELEVISION



Corridor Light

(10) Holophane Co. Inc., 342 Madison Ave., New York 17, N. Y.

This new luminaire for corridors is designed to send light up to the ceiling and across the walls, as well as down to the floor. Reflections from these surfaces result in balanced illumination with high visibility, the manufacturer points out. The redirection of light, avoiding the glare area, provides an atmosphere of comfort and safety, it is stated. Economy in installation and maintenance is claimed for the new light, C-824.

Luminaire for MV Systems

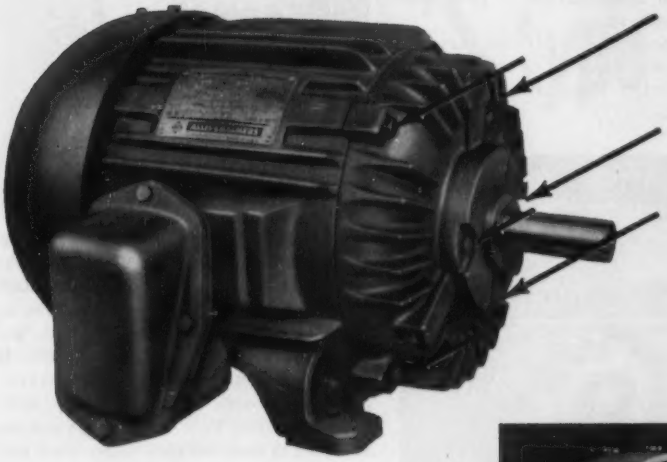
(11) Line Material Co., Milwaukee 1, Wis.

A new Ovalite for multiple or series ballasted mercury vapor systems accommodates horizontal mounting of C-H5, A-H1, E-H1 and J-H1 lamps; provides a type III distribution pattern with uniform brightness, its manufacturer states. It will also accommodate incandescent lamps in sizes up to 15,000 lumens.

Lamp positions are adjustable to allow for differences in lamp centers. An adapter is available for positioning the C-H5 lamp. The cast aluminum hood houses the Alzak-treated aluminum reflector and supports the hinged refractor. An automatic, sleetproof latch holds the refractor against the hood gasket.

(12) INFRARED REFLECTOR — Miskella Infra-Red Co., 7301 Grand Ave., Cleveland 4, Ohio, is making the Hi-Heat L L infrared reflector unit for use with the new tubular lamps—500 w 5 in. lighted; 1,000 w 10 in. lighted.

Here's motor superiority
you can see

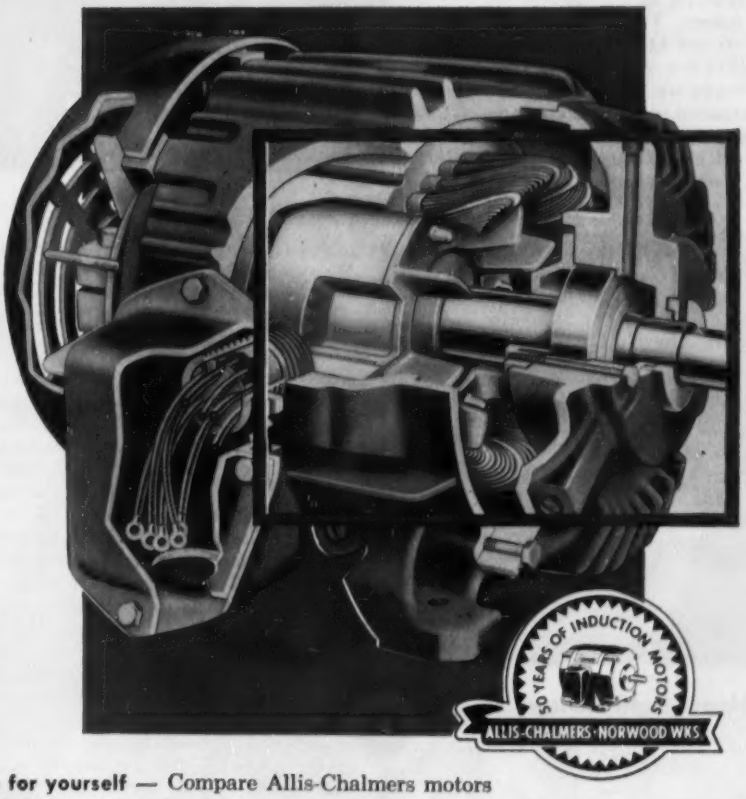


It takes 6 bolts not just 4 to give full bearing protection

THE TWO EXTRA BOLTS in the end housing of every Allis-Chalmers ball bearing motor are the proof of *extra* protection against bearing failure. These are the bolts that hold the bearing cap tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Result? Allis-Chalmers motors pay off in longer, trouble-free bearing life, lower motor maintenance.



Get all the facts . . . judge for yourself — Compare Allis-Chalmers motors with other motors. Get the six-bolt construction that gives you complete bearing protection. For proof, see your Allis-Chalmers Office or Authorized Distributor, or write — Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-4441

(13) UNQUENCHABLE—Made of quartz, this infrared heat lamp is not affected by thermal shock, water or acid baths; will withstand violent temperature changes, according to its manufacturer, General Electric Co. The lamp also is claimed to achieve higher concentrations of energy than have been possible in the past. It comes in a tubular shape, slightly larger in diameter than a cigarette. Two sizes are being introduced—500 and 1,000 w for use on 115-125 and 230-250-v circuits respectively. Lighted lengths are 5 and 10 in. First application is expected to be in industrial radiant drying and baking ovens. Details may be secured from the G-E Lamp Division, Nela Park, Cleveland 12, Ohio

Home Light Control

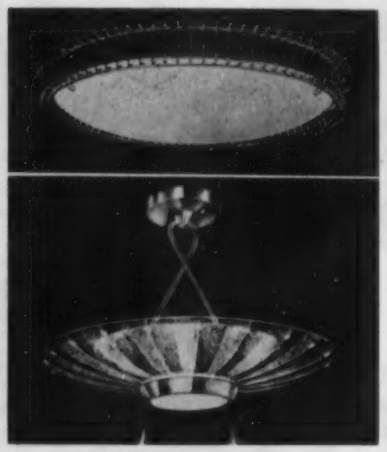
(14) The Superior Electric Co., Bristol, Conn.

Designed to permit light intensity of lamps to be set to any value from complete darkness to full brightness, Luxtrol operates on the dimmer principle used in theaters; can handle any number or combination of lamps up to a load of 360 w. It can be wired into new or existing circuits.

Essentially, the unit is a 360-w variable autotransformer operating from a 120-v a-c source. A movable brush contact rides on a bared portion of the winding. Rotating the contact arm by turning the knob produces any desired light intensity.

A switch is incorporated at the blackout position to shut off the entire circuit. No external switch is required. Only the current required to produce the desired illumination is used, the manufacturer states.

A change of the knob can vary the color scheme, rearrange accents or alter the entire tone of a room, it is pointed out.



Interior Lighting

(15) Lightolier Inc., 346 Claremont Ave., Jersey City 5, N. J.

Polished brass wire forms and shallow depth are featured in the Accent Pacemakers series, designed for low-ceilinged interiors. Overscaled to provide a generous light area, these fixtures give no feeling of weight or bulk; have a "see-through" effect, the manufacturer states. Texture in the ceramic glass diffusers is applied by silk screen, then baked into the glass.

The new design includes two types: the Necklace and the Crown (pictured). The former is available in 18¾ and 24½ in. diameter; the latter in 19½ and 24½ in. All are 4½ in. deep.

This manufacturer has announced three new designs in its Claremont Collection introduced a year ago — a round double-bowl fixture (shown); a round bowl within a square bowl; a wall bracket. This series, the Astrals and the Traveler, which have been on limited distribution, are being made available for full distribution, it is stated.

Fill in Coupon, Page 66

(16) FLUORESCENT—A new 8-ft lamp is claimed to produce more light than previous fluorescent types. The rapid-start high-lumen F lamp can produce light at the efficiency of 70 lumens per watt; has approximate initial brightness of 2,560 ft lamberts, according to its manufacturer, Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y. It was introduced in standard cool white; other colors will follow. Rated life on three-hour cycle is 7,500 hours.

Mercury Lamp

(17) Westinghouse Lamp Division, Bloomfield, N. J.

A de luxe golden white 400-w mercury vapor lamp added to the manufacturer's line is known as the type M-H1. The color-corrected lamp is intended for commercial installations, high-ceilinged offices, libraries, outdoor lighting and other large area applications.

This lamp uses a larger bulb than the standard 400-w fluorescent mercury lamp, according to the manufacturer, and for best results fixtures such as those developed for the 1,000-w fluorescent mercury lamp should be used. The lamp will operate with standard 400-w ballasts. Average life is 6,000 hours. The standard fluorescent mercury is shown at right; the new de luxe golden white at left.

TODAY'S BIG IDEA

IN HIGH VOLTAGE APPARATUS BUSHINGS

IS SMALLER, LIGHTER...

it's LOCKE'S type U

For 92 KV and above. Type U gives you all the desirable electrical characteristics of earlier bushings PLUS the added advantages of smaller dimensions and lighter weight.

For example, Locke's 161 KV Type U bushing is 6¼" smaller in ground sleeve diameter, and 590 lbs. lighter than its equivalent of earlier design.

This means transformers and oil circuit breakers can now be built lighter and smaller . . . something you've always wanted.

Locke Type U bushings are ideal for replacement purposes because they are easier to handle during installation . . . require less storage space.

Specify them for your apparatus.

DESIGN ADVANTAGES OF LOCKE'S TYPE U APPARATUS BUSHING

1. LIGHTER WEIGHT and smaller diameter made possible by a special oil-impregnated paper core with imbedded *conducting stress* equalizers. This, together with terminal and ground shielding, provides uniform internal voltage gradients as well as controlled external voltage distribution. The bushing is much smaller in weight and diameter without sacrifice of dielectric strength.

2. PERMANENT HIGH DIELECTRIC strength of paper core assured by positive seals and inert gas pressure against entrance of air and moisture.

For use at 69 KV and below, specify Locke's Type LC Bushing.

3. INITIAL LOW POWER FACTOR of bushing *remains* low in service.

4. CAPACITANCE TAP is standard feature, providing a voltage supply for potential devices and simplifying power-factor testing.

5. CORONA-FREE, Locke Type U has excellent radio-influence voltage characteristics.

6. NO SERVICING REQUIRED other than periodic inspection and cleaning of porcelain surfaces.

LOCKE

LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

For your

EXACTING REQUIREMENT

in

VINYL SLEEVING

Precise compounding, superior workmanship, rigid quality control, meticulous inspection are the important features that simplify the use of Resinite Extruded Tubing in your product.

✔. *A superior insulating sleeving that meets Military and Governmental specifications.*

✔. *A High Heat Electrical Grade Sleeving for general purposes; Underwriters approved.*

✔. *Available from stock in 36" length or in coils plus many standard colors of your choice; yellow, green, red, blue, black, white and transparent. A full range of diameters, size #20 to 2¼" I.D. Built to accuracy.*

Call or write us today for details.

Resinite

Another TRI-STATE feature!

For the nation's finest electrical, electronic, and industrial supplies, make

ONE CALL FOR ALL TOP BRANDS

TRI-STATE

SUPPLY CORPORATIONS

LOS ANGELES 13 • 544 South San Pedro St. MUtual 2354

SAN FRANCISCO 7 • 544 Bryant Street EXbrook 2-8890

SEATTLE 4 • 318 Occidental Avenue Main 4161

Recessed Fixtures

(18) Markel Electric Products Inc., Buffalo, N. Y.

A line of self-locking, screwless, detachable recessed fixtures is ready to install with ordinary house wiring, the manufacturer states. These fixtures come with either prewired or unwired recess boxes. The prewired boxes are ready to install to standard 60° wire; the unwired to 125° to 150° AF wire. They range in size for 60-, 100- and 150-w lamps.

Advantages listed are simple speedy installation, adjustable all-position hangers, smooth flush mounting, with no need for special framing, specially engineered seal that eliminates light leakage. Standard finishes are polished chromium, high baked white enamel and polished brass. Other finishes are available on special order.

Luminaire

(19) Lighting Products Inc., Highland Park, Ill.

The new Arealux is described as a shallow, wide area fluorescent luminaire for schools, libraries, stores and offices. It is 35¾ in. wide, 5 in. deep; may be surface mounted or suspended, singly, in a continuous row or side to side. Top reflectors are available where only down light is desired. There are three lengths: 4, 6 and 8 ft.

Shallow F Unit

(20) Smithcraft Lighting Division, Chelsea 50, Mass.

The Sheraton, a new fluorescent fixture, is 3¼ in. deep and can be used as a surface troffer. It is suggested by its manufacturer for low-ceiling school rooms and offices. It has translucent plastic sides and a one-piece steel louver with a cutoff of 30° crosswise, 45° lengthwise; comes for two or four 40-w rapid-start bipin lamps and for two or four 48- or 96-in. slimline lamps.

Decorative Lamp

(21) North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.

A new type tungsten filament lamp, the Nalcobrite, is designed for crystal type and other decorative lighting fixtures. It is hand tipped to give a long, slender, pointed effect. The elongated tungsten filament is said to give more light and better diffusion of light without hot spots. Both 25- and 40-w bulbs are available with candelabra, intermediate or standard bases and in clear or frosted glass.

Sealed-Beam Fixture

(22) Killark Mfg. Co., Vandeventer & Easton Ave., St. Louis, Mo.

New weatherproof holders were designed to give a relatively narrow distribution of light from a compact source, with flexibility of aiming, easy maintenance of light output and minimum of cleaning, according to the manufacturer.

The fixtures are wired at the factory and wiring is completely enclosed. Receptacle arrangement enables the lamp to be rotated for maximum efficiency, the manufacturer states. Protective lens with channeled rubber seal is fastened in the hinged ring by two clips. The entire holder is quickly adjusted to either vertical or horizontal positions and easily locked in place, it is stated.

Designated the SSNB series, these units are made of the manufacturer's Alumalloy; are claimed not to rust or corrode.

Moistureproof Fixtures

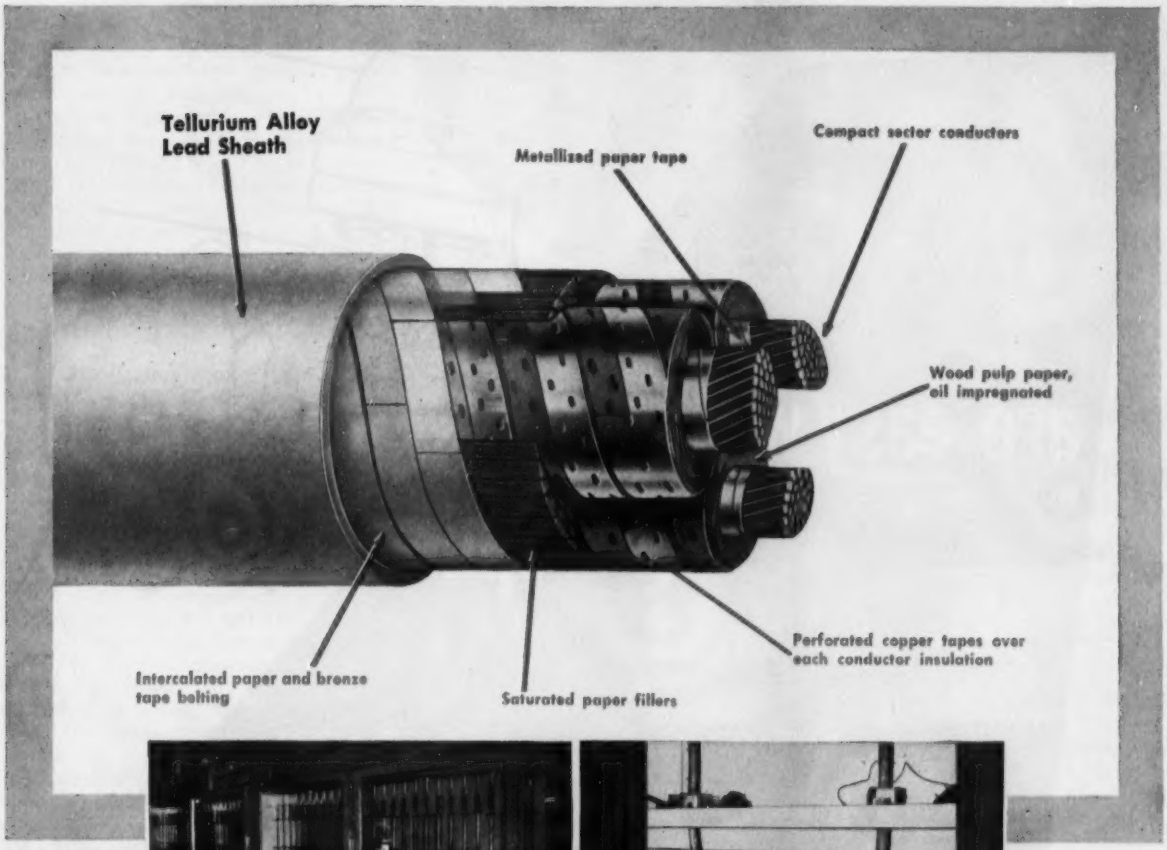
(23) John I. Paulding Inc., New Bedford, Mass.

Moistureproof construction of two new lighting units is secured by use of a special waterproof cement that seals wiring and sockets and by two rubber gaskets, one between fixture and wall or ceiling and the other between shade and fixture.

Both units have opal glass shades designed to give even, general illumination. One shade has a clear fresnel lens at the bottom to concentrate light directly below it. Length of this fixture is 7 in. over all. The other fixture is 6¼ in. long. Both take bulbs up to 100 w. Rated for 660 w, 250 v; carry UL label.

(For bulletins, fill in coupon on page 66)

FOR INCREASED LOAD REQUIREMENTS...PAPER INSULATED CABLE WITH TELLURIUM ALLOY LEAD SHEATH


Tellurium Alloy Lead Sheath
Metallized paper tape
Compact sector conductors
Wood pulp paper, oil impregnated
Perforated copper tapes over each conductor insulation
Intercalated paper and bronze tape bolting
Saturated paper fillers

Some of the specially-developed testing equipment with which Roebling maintains quality control of the production of Tellurium Alloy Lead Sheath. #1 Temperature control ovens for creep test of strips cut from tellurium alloy lead cable sheathing.. #2 Temperature control oven for bending fatigue test of full cable section.

YOU'LL REALLY solve power cable headaches with Roebling Paper Insulated Cable with the new Tellurium Alloy Lead Sheath*, a Roebling exclusive. Here are some of its outstanding advantages:

1–Tellurium Alloy Lead Sheathed Cable has a lower long-time creep rate;
2–Extra high fatigue resistance;
3–High bursting strength;
4–Exceptional stability under heat application as in duct splicing and wiping;
5–Abolishes need for frequent stop joints or reinforced lead sheath;
6–Doesn't require generous expansion bends or large manholes;
7–Heat application in splicing leaves its desirable properties unimpaired.

WRITE US FOR FULL DATA. John A. Roebling's Sons Corporation, Dept. 707, Trenton 2, N. J.

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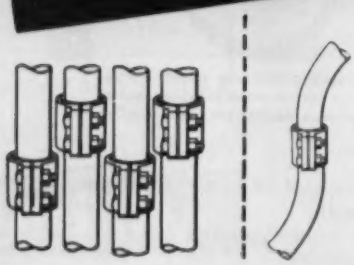
SUBSIDIARY OF THE COLORADO FUEL AND IRON CORPORATION

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 81 SLEEPER ST. & 9 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13335 LAKEWOOD HGTS. BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, ROOM 339, HENRY W. OLIVER BLDG. • ROCHESTER, 1 FLINT ST. • ST. LOUIS, 3001 DELMAR BLVD. • SALT LAKE CITY, 526 W. 8TH SOUTH STREET • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

*"TOUGH" conduit coupling jobs

(Type "SP")
Interior thread meshes with conduit threading for rigid, tight-fitting connection.
are easy with O. Z.
split couplings
Bolt heads are held in place by shoulder on coupling, eliminating need for second tool.
One piece malleable iron construction facilitates handling during installation.
To install, simply slip over one conduit end, butt ends of both conduits, slide fitting back into position and tighten nuts.



* "Tough"—(Where ordinary couplings can't be installed). Are clearances close—near floor, wall, ceiling or other obstructions? Can conduits be turned due to bends? Is space or accessibility a factor? Just install an O. Z. Type "SP" Split Coupling.

Butt the conduit ends within the O. Z. Split Coupling —tighten two nuts with an ordinary open-end wrench and presto . . . you have a permanent, close-fitting, rigid connection.

Drastically reduced installation costs, plus initial savings of as much as 50% in larger sizes, over similar competitive fittings, are just two of the many reasons why you should specify O. Z. Split Couplings for your difficult conduit coupling jobs.

Call your local O. Z. distributor . . . he is ready to make immediate delivery from stock on sizes from ½" to 5".

O. Z. ELECTRICAL MANUFACTURING CO., INC.
262 BOND ST. • BROOKLYN 17, N.Y.
CAST IRON BOXES • SOLDERLESS CONNECTORS
CABLE TERMINATORS • GROUNDING DEVICES
POWER CONNECTORS • CONDUIT FITTINGS

New Lamps

(24) Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

A 150-w light bulb designed specifically for reading has a special coating claimed to give improved light diffusion and to soften harsh shadows. It is designated A25 Reading Lite.

The new Super DeLuxe Cool White fluorescent lamp was developed for stores and offices; is said to be flattering to both customer and merchandise. According to the manufacturer, it eliminates confusion between colors as seen under fluorescent lighting and in daylight or incandescent home lighting.

Pilot Light

(25) Crouse-Hinds Co., Wolf & 7th North St., Syracuse, N. Y.

New-type EMP explosion-proof miniature pilot light Condulets for panelboards are similar to type EGP, style 1 units except that a single flat joint cover is used in place of threaded covers. Type EMP is much smaller than type EGP and takes less panelboard space. It is available in 1, 2 and 3 gang sizes, 3⅜, 5¼ and 6⅞ in. long over-all respectively. Over-all width is 2 1/16 in. 1⅛ in. diameter holes spaced 1⅝ in. in panels will accommodate threaded necks of the pilot lights. EMP Condulets can be used on panelboards of thickness up to 1¼ in. Threaded necks are provided with locking nuts.

(26) SCHOOL FIXTURE—A fixture designed to meet the new American School Standard has been announced by Gibson Mfg. Co., 1910 Piedment Circle N. E., Atlanta, Ga. Designated the MP-45, it has 45x45° shielding; is available in two-light, 40 w; two light, 40 w tandem; two light, 75 w, with a choice of all metal or plastic side panels.

(27) REFLECTORS—Interchangeability is featured in the new design of Duratach and Solid Neck reflectors made by Wheeler Reflector Co., 275 Congress St., Boston, Mass. Basic pendant installation can be converted to side outlet or outlet box. Reflectors come in a choice of five models—RLM standard bowl, 30° angle bowl, deep bowl, shallow dome and elliptical angle.

(28) PATIO LIGHT—A weatherproof unit, the Patiolite, has been announced by Steber Mfg. Co., Broadview, Ill., for use in outdoor or semienclosed patios. It is 49 in. tall; is equipped with either 10- or 25-ft cord. Metal reflector is 16 in. in diameter. Finish is greentone. Catalog sheet 1068 gives details. Other garden and play area lighting units recently introduced by this manufacturer are covered in bulletin 135-54.

(29) OUTDOOR LIGHTING—The Lytescape series, including six spot, four path or shrub and two terrace lights, has been introduced by Lightolier Inc., 346 Claremont Ave., Jersey City, N. J.

...thanks to HUBBELL Twist-Lock® TRADE-MARK 4-WIRE ELECTRICAL CONNECTORS

Wherever portable electrical apparatus is used, Hubbell Twist-Lock is recommended for 2, 3 or 4-wire systems.

Twist-Lock 3 and 4-wire sizes are available grounded and not grounded.

7413 Connector body

7408 Flush Motor base

4893 Seal-tite rubber cover and chain used to close face of 7408 when not in use. (Unit not shown)

Hubbell sales engineers will gladly consult with you on special problems. Write Dept. R-1 today for help or information.

Mobile cafeteria trains, an entirely new idea in feeding large numbers of employees, are now employed at the new Torrance location of the El Segundo Division of Douglas Aircraft Company, Inc., California. The food is transported to all parts of the 214-acre plant, piping hot and ready to serve, by means of 12 three-car trains.

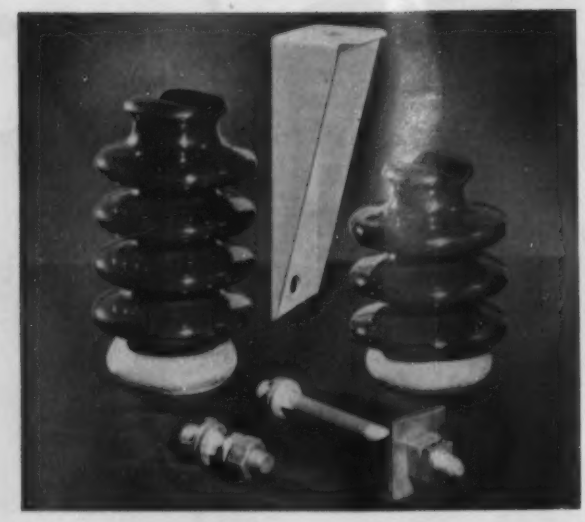
Hubbel Twist-Locks play an important part in this operation. When the battery-powered train pulls up to its station, the operator Twist-Locks unit to a plant outlet to supply power for refrigerators, ovens, etc. In addition, each car is inter-connected with 4-wire Twist-Locks.

Here is another practical modern application showing the versatility and dependability of Twist-Lock, first and still the finest self-locking connector made.

Highest Grade HEAVY DUTY WIRING HUBBELL DEVICES

HARVEY HUBBELL, INC.
BRIDGEPORT, CONNECTICUT

21HH54



Distribution Posts

(30) Lapp Insulator Co. Inc., LeRoy, N. Y.

These new distribution posts come in two sizes, one rated 27 kv, the other 20 kv. They are solid vacuum process porcelain posts cemented into galvanized steel bases that take standard line post studs.

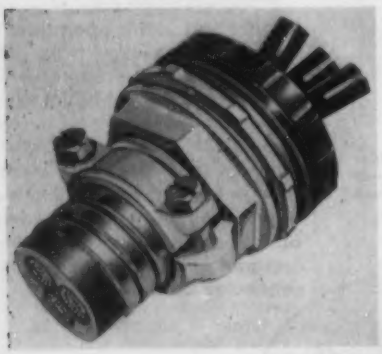
They are said to be completely punctureproof; free from radio and TV interference without coating, treatment or attachment; strong mechanically and rugged against power arcover and mechanical abuse; to be well adapted for horizontal mounting.

The larger insulator is intended particularly for use on 14.4/24.9-kv circuits; the smaller for lower voltage distribution and farm lines.

A pole-top bracket was designed especially for these units.

Cable Clamp

(31) O. Z. Electrical Mfg. Co. Inc., 262 Bond St., Brooklyn 17, N. Y.



Type PK armored cable clamp has slotted hex bolts that may be tightened by wrench or screw driver; a flanged body that eliminates need of an extra lock nut for securing it in the knockout hole. It has a malleable iron body with a clamping cap that fastens to the body by means of slotted hex-head bolts. It is designed with ample thread length for use with all standard conduit fittings and terminators from 1 to 5 in. and is available for interlocked armored cable ranging from .99 in. O.D. to 4.38 in. O.D. Bakelite insulating bushings protect individual conductors at the point where they emerge from the fitting.

For More Data Fill in Coupon on Page 66

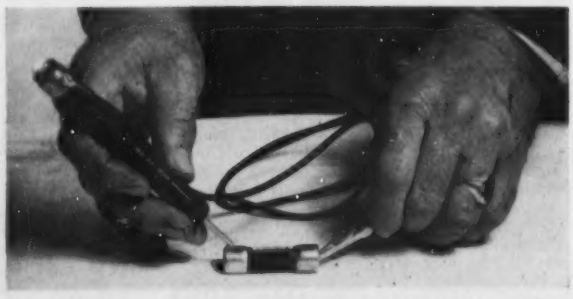
Control Center

(32) Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.

This control center was designed for flexibility, its manufacturer states. A removable operator's panel in the door of each individual combination plug-in accommodates up to four push buttons, selector switches or pilot lights. This facilitates removal of control center units since no wires to pilot devices in the door need be disconnected, it is stated.

The units are enclosed on all sides to localize damage in case of fault. Unit doors are attached to the main structure and can be reclosed after the unit is removed to protect operators. A steel barrier separates the horizontal wiring channel from horizontal bus bars.

High short circuit strength is obtained by edge-to-edge mounting of horizontal bus bars and by use of strong tubular vertical bus, it is stated. Standard section dimensions are 20 in. wide, 20 in. deep, 90 in. high. Each section will accommodate up to six combination starter plug-in units. Details are given in manual SM 244.



(33) TESTER—Made of dielectric material, this device will test fuses of any type or size, locate grounded wires, find shorted circuits, test contactors in a power panel or control circuit, follow through interlock contactors on a switchboard, locate wire in a circuit. Burnworth Tester. 815 Pomona Ave., El Cerrito 8, Calif.

BULLDOG ALUMINUM BUStribution® DUCT helps North American build Super-Sabres

1600-amp. LO-X BUStribution serves as main feeder to welding department to minimize voltage drop during welds.

North American F-100 Super-Sabre

600-amp. Plug-In BUStribution, with tap-off provisions each 10", provides 100% coverage of production area with 50-foot runs.

To keep their famous Super-Sabre Jets rolling smoothly off the line, North American Aircraft needed a dependable, flexible power distribution system. That's why, in two installations alone, they installed more than half-a-mile of BullDog Aluminum BUStribution Duct.

The high bay construction, and the obstacles presented by girders and pipes in the North American plant, were a natural for the use of lightweight aluminum bus duct. The weight saving in each 10′ duct section greatly eased the strain of the extra handling required in the installation job. Less dead weight on building superstructures, too.

These savings in installation costs — in addition to lower first cost — are prime reasons for the widespread use of BullDog Aluminum Conductors in plants throughout the country.

Aluminum BUStribution Duct features in its design the same quality and dependability that have gained BullDog world-wide reputation as a pioneer of bus bar distribution systems. It is completely interchangeable with other BullDog BUStribution systems and is listed by Underwriters' Laboratories, Inc. For complete information, consult your local BullDog Field Engineer. Or, write: BullDog Electric Products Company, Dept. EW-64, Detroit 32, Michigan. ©BEPCO

Export Division:
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New York 16, New York

In Canada:
BullDog Electric Products Co. (Canada) Ltd.
80 Clayson Road, Toronto 15, Ontario

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HERE'S SAFETY—SERVICE

you can always depend on. For Klein tools and equipment are designed better for your jobs—made of the finest materials—individually tested and inspected. Look for the familiar Klein trade-mark—serving the electrical industry "since 1857."

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Foreign Distributor:

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Write for your free copy of the Klein Pocket Tool Guide Today!

Mathias KLEIN & Sons

1200 BELMONT AVE. CHICAGO 18, ILL.

Pumping Control

(34) Federal Pacific Electric Co., 50 Paris St., Newark, N. J.

A complete new line of both single-phase and three-phase controls has been announced by the manufacturer for cross-the-line starting of squirrel cage motors used to drive oil well and other types of pumps.

The control consists of Federal Noark across-the-line starter with overload protection and a "Hand"-"Off"-"Auto" selector switch with an undervoltage relay and a lightning arrestor. A motor-driven 24-hour time switch permits definite time operation of automatic pumping cycles.

Disconnecting means and short circuit protection of the starter, motor and wiring on the load side are provided either by the Noark type AB circuit breaker or type A heavy-duty front-operated fusible safety switch.

All equipment is mounted in a raintight enclosure on a removable steel back plate designed for quick, easy maintenance and replacement.

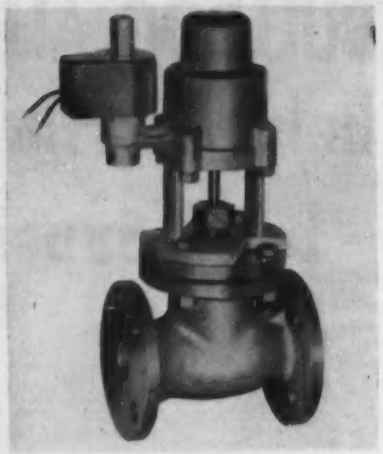
Bus Support Clamp

(35) Burndy Engineering Co. Inc., Norwalk, Conn.

This new range-taking bus support clamp, type UHKR, was designed to accommodate either cable or tube on indoor or outdoor substation insulators. It is of all-bronze construction and has kidney slots in its base to permit angular adjustment. Durium bronze hardware is provided to develop constant high clamping pressures, insuring low contact resistance, the manufacturer states.

(36) WINDINGS — Availability of Permeron nickel-iron cores for torroidal windings has been announced by the Rectifier Division of I-T-E Circuit Breaker Co., 19th & Hamilton St., Philadelphia 30, Pa. Originally developed to provide a high permeability core for the saturable reactor on its mechanical rectifiers, the manufacturer states that production now permits marketing a range of sizes up to 20 in. O.D. for other applications.

Fill in the Coupon on Page 66



Solenoid Valves

(37) Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.

A new line of cylinder operated solenoid pilot controlled valves for handling corrosive gases and liquids is available in a choice of body materials to suit the fluid controlled. These bulletin 8338 valves are listed with bronze body and trim; cast iron body, nickel alloy trim; cast steel body, stainless steel trim; Aloyco steel No. 18/s or No. 20 body, stainless steel trim; monel body and trim. Other materials are available.

The standard valve is suitable for either normally open or normally closed operation; comes with standard, watertight or explosionproof solenoid enclosures; can be mounted in any position; has full area ports.

Valves require a separate source of air, water or oil for operation. Operating pressure is dependent upon the pipe size and auxiliary pressure available; curves of auxiliary vs main line pressure can be furnished.

The cylinder, operated from a separate source, provides ample power to operate the valve under the most difficult conditions and allows the use of stainless steel valve bodies, according to the manufacturer.

(38) GASKETING — General Electric Co.'s Silicone Products Department, Pittsfield, Mass., has announced two new silicone rubber compounds. They are SE-370 and SE-380. The Class 300 stocks are claimed to exhibit the lowest compression set of all known elastomers over a wide temperature range up to 500 F. The new compounds provide stiffer stocks and are characterized by low shrinkage and low moisture absorption, it is stated.

(39) CALIBRATION DEVICE — An instrument standardization console for general instrument calibration has been developed by G-E's Special Products Section, Schenectady 5, N. Y. It meets demands of both large and small instrument servicing groups.

The smallest thing in your turbine

...yet it can cost you $5000 an hour

You can hardly see it here. You'll probably never see it in your turbine. It's a tiny spot of rust.

But let it grow big enough to flake off into your turbine's lubricating system, and it may knock out the governor.

Then you're in for trouble. Trouble that can cost up to $5000 an hour in shutdown costs and lost revenues. Many recorded case histories prove this.

But, this needn't happen to you—if you use Shell Turbo Oil. For this unusual oil contains the *most effective rust inhibitor yet devised!*

Test after test has proved that no other turbine oil is so effective in preventing rust—*even in the presence of salt water!* In one installation, for example, the original charge of Shell Turbo Oil has been in use since 1940!

So make sure your turbines are protected from costly rust. See your Shell representative about rust inhibited Shell Turbo Oil today.

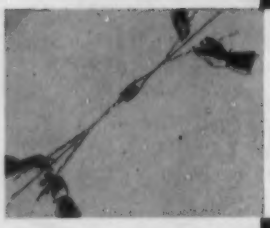
SHELL

***Stop rust now before it's big enough to stop you...with* SHELL TURBO OIL**

GUY-GRIPS COST LESS

per pound of tensile strength

per year of service life



PREFORMED "GUY-GRIPS" are the fastest, most economical and most efficient means of dead-ending guys. They eliminate the need for clamps and ARE INSTALLED BY HAND. Since they cannot slip whether they are dead-ending a 2,000-pound, solid-wire guy or a 40,000-pound, ⅛" EHS steel guy, no retightening is ever necessary.

One large Utility has found that Preformed "Guy-Grips" save 50% on labor and 20% on material. Another assembles and installs a complete Preformed Guy Assembly (4 dead-ends) in the same time it used to take to assemble just one 3-bolt clamp.

PREFORMED "GUY-GRIPS" are proving definitely throughout the Country that they assure:

Maximum
- Corrosion Life
- Installed Tensile Strength
- Fatigue Characteristics
- Impact Strength
- Neatness in Appearance

Available in aluminum, copper, bronze (various grades including calsun), copperweld, stainless steel and galvanized steel, PREFORMED "GUY-GRIPS" assure the longest satisfactory guy life.

For complete details of their exclusive advantages, write, or telephone Cleveland: EXpress 1-3571.

PLP

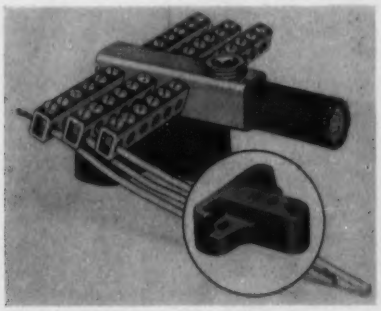
PREFORMED LINE PRODUCTS CO.

5349 ST. CLAIR AVE. • CLEVELAND 3, OHIO

Shaft Seal

(40) Line Material Co., Milwaukee 1, Wis.

A new seal has been designed for the operating shaft of the tap changers in the manufacturer's round-wound transformers rated 250 through 500 kva. Among advantages of the new seal design are a reduction in packing gland size, improved sealing with low gland pressure, greater ease of operation because of low frictional properties of the packing material, long operating life and the elimination of the need for field adjustment and maintenance, the manufacturer states. The seal utilizes Teflon packing rings.



Neutral Bar

(41) Ilsco Copper Tube & Products Inc., Cincinnati 27, Ohio

The Can Neutral Bar is compactly built for use in limited space; is neat because wires are not crossed, connections being made parallel to each other, its manufacturer states. Circuit bars are forged into the main line connectors at a 20° angle for easy wire insertion of every branch circuit wire.

Better connections are claimed because there is no spreading of wires away from the screw head. Among other features listed are: elimination of washer head screws; quick, perfect connections, with wires inserted in V-shaped hole when screw is pulled down; large wire range—circuit taps take No. 14-6 and main line load is 250 MCM-6; outlets are identified and circuits can be traced easily; main lug and circuit bars are forged together, eliminating need of attaching separate line load connector; 100% extra hard drawn seamless tubing used in construction.

The unit is sold with or without the mounting block shown in the illustration.

(42) NAME PLATES—Speedy-Cals made by North Shore Nameplate Co., Glenwood Landing, Long Island, N. Y., permanently adhere to such surfaces as porcelain, glass, Bakelite, wood and metal, it is stated. They come in colors and in clear aluminum, are claimed not to crack, peel, chip or tarnish.

Here's Better

HIGH-BAY LIGHTING

...at lower costs!

Brilliant, new Sylvania R-52 Incandescent Reflector Lamps help raise production records, reduce maintenance.

Results show that R-52 Reflector Lamps greatly improve factory seeing conditions and enable workers to step up production.

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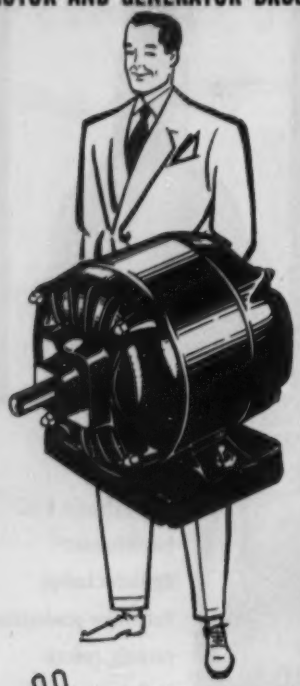

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BULLETINS ETC.

(43) CONDUCTOR—Expanded ACSR for "superhigh" voltage transmission—300 kv and above—is the subject of a bulletin offered by Aluminum Co. of America, 732 Alcoa Bldg., Pittsburgh 19, Pa. The booklet describes research, engineering, laboratory and field tests involved in developing the new conductor. Special accessories are described. Stress-strain and sag-tension information is included. Illustrated by drawings, charts and photographs.

(44) MECHANISM—Type OA hydraulic operating mechanism for circuit breakers is described in catalog 587 from Federal Pacific Electric Co., 5815 Third St., San Francisco 24, Calif. It is compressed-gas accumulator type; is for breakers to and including 330 kv of medium and large interrupting rating; meets 3- or 5-cycle opening requirements, 20-cycle reclosing.

(45) WORK AREA LIGHTING—Technical data and specifications on its Permaflector industrial units for interior and exterior high- and low-bay lighting are contained in bulletin D offered by Pittsburgh Reflector Co., 406 Oliver Bldg., Pittsburgh 22, Pa. This manufacturer also offers bulletin B on asymmetric silver-mirrored Permaflectors for show windows, perimenter, general and indirect lighting applications.

(46) FARM LIGHTING—Yard and hay mow lighting equipment is described in bulletin No. 122-54 offered by Steber Mfg. Co., Broadview, Ill.

(47) FIXTURES—A folder showing store, factory, office, school and other lighting installations is offered by Electro Silv-A-King Corp., 1535 S. Paulina St., Chicago 8, Ill.

(48) F GUIDE—A fluorescent guide book, written in nontechnical language for buyers and sellers of fluorescent products, has been announced by Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y. It has information on what fluorescent lighting is, its advantages, lamp sizes available, colors, accessories and other facts. Copies are available through the manufacturer's district offices.

(49) STREET LAMPS—Technical data on lamps for street and highway lighting is given in an eight-page booklet, S-413, from Westinghouse Electric Corp. Lamp Division, MacArthur Ave., Bloomfield, N. J. Designed as a selection guide, it gives information on all lamps in common use as well as others recommended for this type of service.

(50) STAGE LIGHTING—A new system of stage lighting for elementary schools is described in bulletin ES-54 from Hub Electric Co., 2255 W. Grand Ave., Chicago 12, Ill. According to the manufacturer, the simplified system offers variety of lighting effects, minimum initial installation cost with provision for later expansion, easy mounting facilities. It can be used for existing and new stages.

(51) FIXTURES—Five new catalog pages on its large area 3800 series and recessed incandescent series with Holophane "dropped" Controlens are offered by Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.

(52) RECESSED FIXTURES—New designs for recessed fixtures using Holophane Controlens are shown in a catalog from Marvin Mfg. Co., 648 Santa Fe Ave., Los Angeles, Calif. This line can be relamped from the floor with a lamp changer.

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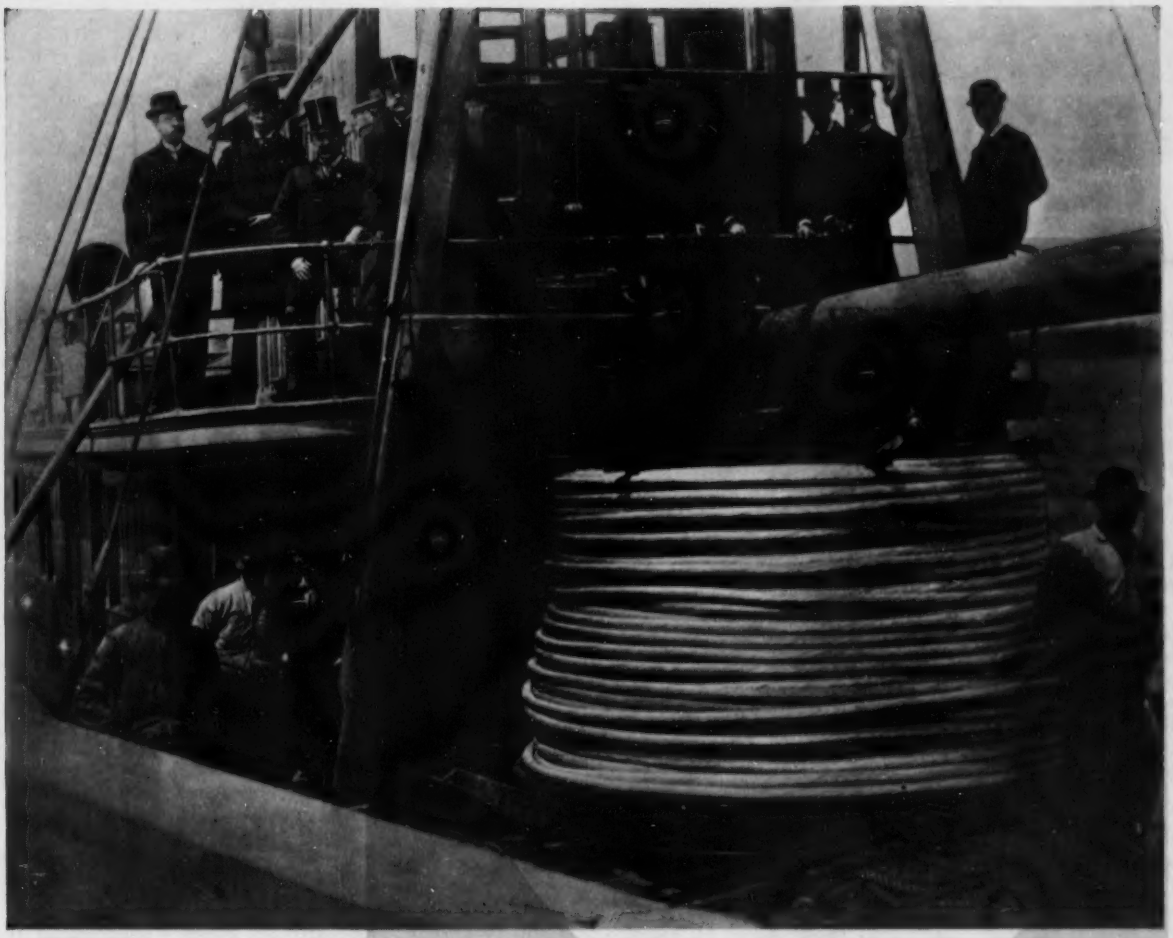

1880 *preferred then . . . and now*

THIS reproduction was made from an old photograph dated 1880, found in the Kerite archives at Seymour, Conn. It was taken as the steam tug "Western Union" completed the laying of an 18-conductor Kerite insulated submarine telegraph cable from New York, under the Hudson River, to Jersey City. It indicated that Kerite insulated cable was contributing to the furtherance of submarine telegraph circuits long before the turn of a century.

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ELECTRA'S HUSBAND

"NOTICE: Hot water will be turned off for a few hours beginning at 8:30 in the morning for the next few days." The neatly typed sign attached to the wall of the elevator with Scotch tape only caused me to reflect that I would not be bothered. Long before that time each morning I would have shaved, showered and been on my way down town. Even so, I spoke to Electra about it when I walked into the apartment.

"What gives with the hot water?" I asked interrupting her daily ritual of listening to 5:45 news.

"Didn't you hear?" she replied. "They are tearing out all of the old rusty iron pipe and replacing it with copper for the hot water lines. It's about time too. Remember that mess in your closet this spring when the pipe burst in the apartment upstairs?"

"I'll not forget it," I huffed. "Every once and awhile I still think some of my clothes smell of musty, mouldy plaster and water. But the landlord is smart to do it. He'll save money in the long run even though the tenants are inconvenienced now."

"That's what the manager said when she told me about the project," Electra commented. "The hot water will be hotter too."

"Fine—now I surely will get scalded when somebody flushes the John in another apartment while I'm in the shower," I rejoined with considerable annoyance. "They put in copper pipes for the hot water but they don't do a damned thing about the copper in the electric wiring."

"Don't work yourself into a sweat," she suggested calmly. "We've discussed that before."

"Yeah, but not lately," I remonstrated. "Have you looked at the outlet alongside my bed recently? There's a real Christmas tree for you—four-way plug on top of a four-way plug. There are two electric blankets, two reading lamps, a clock, a radio and an extension cord for your heating pad all hooked to that one outlet. It's disgraceful."

"Why don't you do something about it?" she taunted.

"By golly, I will. I'll talk to the landlord. We pay enough rent for this place to have good electric service as well as plenty of hot water," I stormed. "Radio and television reception are lousy. If anyone wanted to install a half-horsepower room cooler, it would probably blow the main fuses. There aren't half enough outlets in any room."

"Calm yourself," she said casually. "I've already talked to the landlord. He isn't going to do anything about it because it would cost a small fortune to rewire this place."

"All right then, I'll fix it myself," I sputtered. "George Gray can fix me up with some Wiremold plug-in strip with a pigtail on it that I can fasten to the back of my bed. It will take care of all the stuff in the bedroom. Then I can go out to Sears and pick up a couple of modern lighting fixtures for the bedroom and dining room. I can do it some Saturday."

"What Saturday?" she asked sarcastically. "Next week, next month or next year?"

A little while later when changing into a pair of slacks and a T-shirt it occurred to me that this same kind of a conversation must take place in literally tens of thousands of poorly wired homes and apartments every day. The increasing popularity of the room cooler, along with its low price and its comfort-giving qualities, has brought home quickly and forcefully the utter inadequacy of the wiring in most homes and apartments.

What to do about it? The obvious answer is to go out and sell more and better wiring. Somebody will cynically ask, "how?"

Well, last month Bill Cyr told about the sweet racket that had been uncovered in Oakland, Calif., where a couple of electrical contractors had lost their licenses and several so-called salesmen were threatened with jail sentences for "selling" wiring. These clever rascals used a crude but simple device to demonstrate to the home owner that his existing wiring was terribly overloaded and in need of replacement. They plugged the "test set" into an outlet and then switched in some load, in this instance a heavy-duty heating element. When the exposed Nichrome wires in the set glowed a dull red, they told the frightened homeowner that the wiring inside his walls did the same thing when his lights and appliances were turned on.

"You're lucky that your house hasn't burned down," they said. "And it surely will if you don't do something about it."

Usually the homeowner did do something. He bought at exorbitant and rigged prices, the rewiring installation that the salesman recommended. Sometimes the job was financed on an FHA loan, sometimes it was done for cash. Either way the cost was invariably double or treble the actual value of the job.

"Why," I said to myself, "can't a legitimate wiring job be sold in the same manner? Isn't it possible to rig up a bona fide test set that will demonstrate accurately and convincingly that the wiring is overloaded? If this can be done, who then should do the testing and selling?"

Obviously the one thing that the Oakland slickers had that has been lacking in all other rewiring sales programs was a good healthy amount to cover both the cost of selling and a "profit," even if both were out of all reason. Who in the industry might bear a big portion of the selling cost?

After dinner I told Electra about a possible rewiring program.

"Suppose the whole industry got together and advertised that any homeowner or house dweller could have his present wiring tested free to see if it was safe and capable of handling all of his appliances efficiently," I said to her. "The test could be made by a power company salesman or home economist. If the results showed that more wiring was needed, a contractor could be called in to make an estimate of cost based upon what was recommended. The job could be financed on a long-term loan, either FHA or guaranteed by the utility or some industry cooperative group. It could be a package operation. It seems to me that everyone would benefit."

"Well, why doesn't somebody try it?" was her rejoinder.

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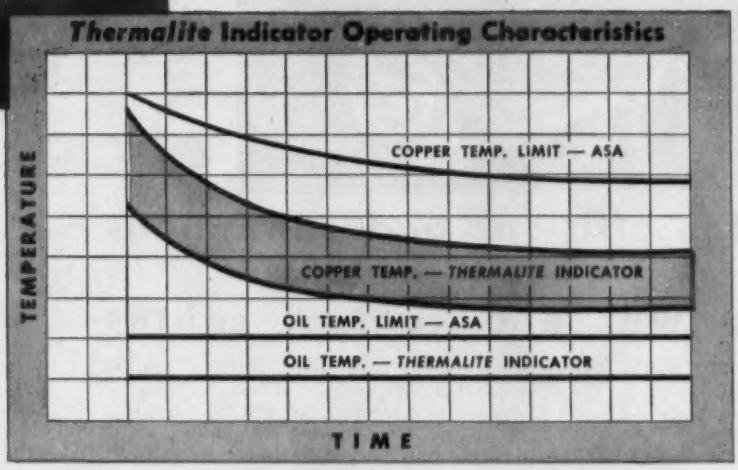

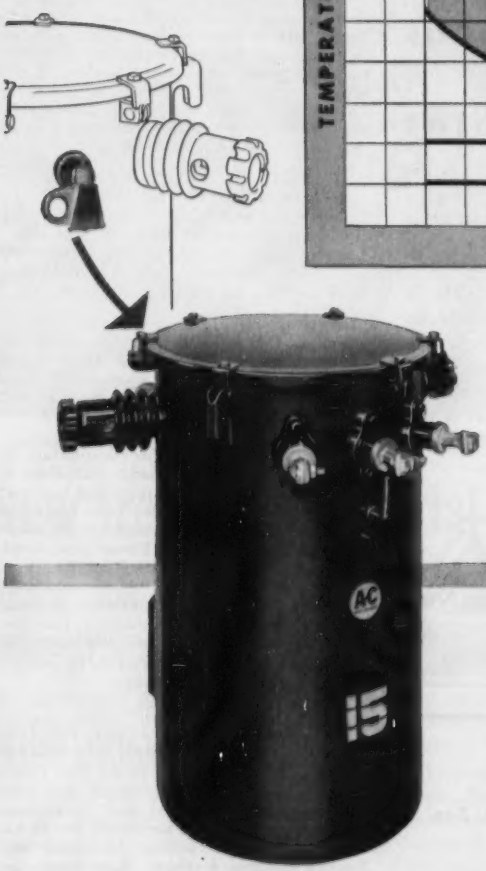

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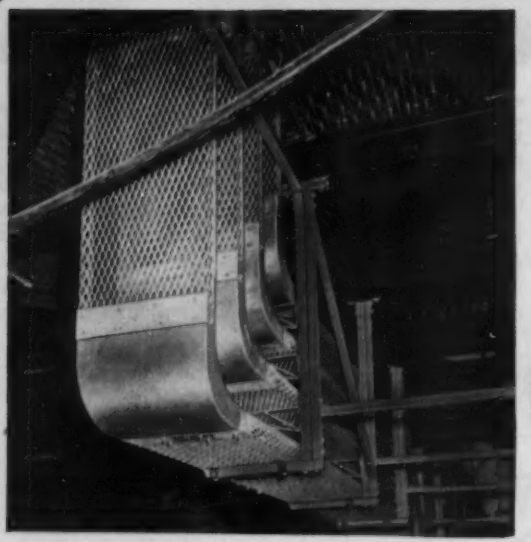

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ELECTRICAL BOOKS

THE DICTIONARY OF BUSINESS AND INDUSTRY, *edited by Robert J. Schwartz, 561 pages, 6x8½, B. C. Forbes & Sons Publishing Co. Inc., $7.95 — with thumb index $8.95.*

A total of 45,000 business terms is included in this volume, including trade names, terms and abbreviations. Industrial and legal terms commonly used in contracts are also listed. American Standards Assn., American Institute of Electrical Engineers, Edison Electric Institute and the Illuminating Engineering Society were among the 1,100 leading trade associations contacted for lists of business terms to be included in this book. It is intended for every-day reference by the businessman; executives and their assistants; secretaries; billing, shipping and purchasing departments; as an aid in standardizing business terminology.

HANDBOOK OF TV REPAIR, *by Robert Hertzberg, 140 pages, 7x10, Arco Publishing Co. Inc., $2.*

By picturing and explaining the structure and parts of television, the author enables the layman to know his set without a course in electronics. Equipment for use in repairing is suggested and the symptoms of disorder are pictured. Tubes, tube testing, antennas, "jitters" and special information on fringe area reception and color TV are some of the subjects covered.

UNIFORM SYSTEM OF ACCOUNTS for Electric, Gas and Water Utilities of the National Association of Railroad & Utilities Commissioners, *fourth reprint, is now available from The State Law Reporting Co., 30 Vesey St., New York 7, N. Y., $4.*

ASTM STANDARDS ON MATERIALS for Radio Tubes and Electronic Devices and Electrical-Heating, Resistance, and Related Alloys, *prepared by ASTM Committee B-4, 244 pages, 6x9, paper cover, $2.75.*

The 1954 edition of this compilation includes 44 ASTM standards, including 30 test methods, 10 specifications and four recommended practices. There are numerous revisions of existing tests and specifications and much new material. Eleven new standards are included, five being specifications, four methods of tests and two recommended practices, one for cathode melt prove-in testing and one for conducting time-for-rupture tension tests of metallic materials. A table of contents is included, by subject and ASTM serial designation.

LINEAR TRANSIENT ANALYSIS, *Vol. 1, by Ernst Weber, 348 pages, 6x9, John Wiley & Sons Inc., $7.50.*

A review of classical and operational methods of analysis is presented before entering upon the Laplace transform and Fourier integral methods. Expositions are accompanied by illustrations of the applications to practical circuit problems. Mathematical background for the various sections is reviewed in appendices and a bibliography of revelant books is included.

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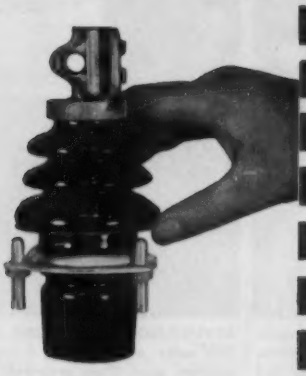

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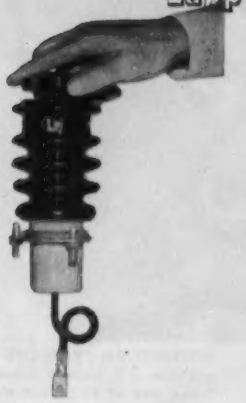

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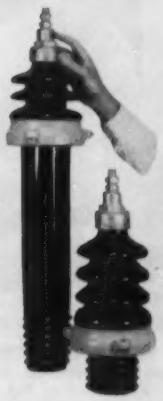

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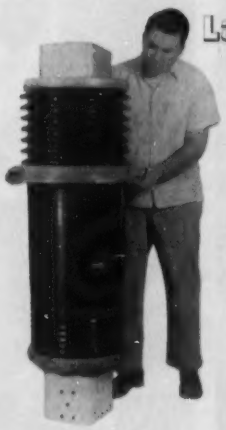

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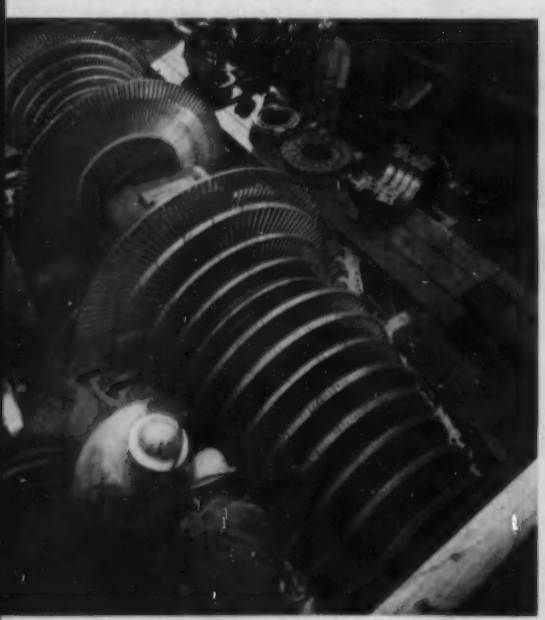

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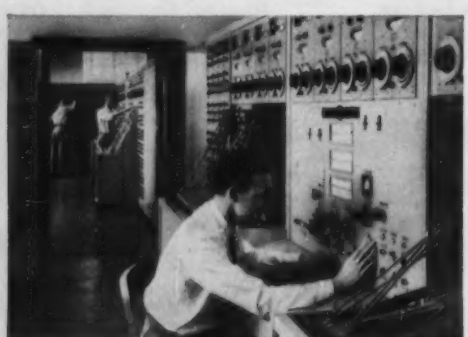

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Sight Is Not Enough for Vision

Light is important not only to aid seeing but to lessen stresses and to create a receptive atmosphere

Howard C. Hall, O. D.
Seattle

No lasting impairment of vision or visual defects will be caused by reading or working under poor lighting conditions we have been told recently in platform talks and in publications.

These statements have been made by respected men in both the illumination and eyesight professions. While there can be no doubt as to the sincerity of the authors of those remarks, if they are allowed to go unchallenged the welfare of the public will suffer. It is time to take a rational view of the entire picture of sight and vision and the difference between the two.

In speaking of the causes of errors of refraction or visual anomalies one must subscribe to one, several or all of three ideas or theories:

1. Historical. The child is born with defective eyes and hence defective vision.

2. Defective Structure. The development of the body structure is defective.

3. Learning. The individual started out with a perfectly good pair of eyes, and the pathways to the central nervous system developed as they should. However, the restraints, the stresses and strains of our culture could bring about deviations in the development of the visual process.

Any one or combination of the above can and do exist. Many of the reference books, including those of the lighting profession that touch on the subject, still explain refractive errors of the eye on an anatomical or axial length basis; i.e.: myopia or nearsightedness as a "too-long" eyeball and hyperopia or far-sightedness as a "too short" eyeball.

If we subscribe exclusively to the first two theories than the only thing that can be done in a specific case is to undertake such treatment that may correct the situation where it is possible or else supply whatever prosthetic device that would act as a makeshift substitute for what should have been normal growth.

Dr. Howard Hall

However, if we believe that the development and use of the visual process follow the same laws applicable to the rest of the body then we can subscribe to the third theory.

My thesis in this article is that axial or anatomical variations can and do exist in refractive errors but this is not the entire story. I believe that in both the eyesight and illuminating professions we have been placing too much emphasis on "sight" and not enough on "vision" and there is quite a difference between the two.

When light is reflected by an object so that the rays fall on the retina of the eye and are there changed from light waves into electrical or nerve waves and are transmitted over the nerve fibers to the cortical areas of the brain and an image is there formed, that is sight.

But when impulses come in from the other sensory areas — touch, smell, hearing, taste—and the emotions, then the final result of all this is vision, the highest sense of man.

According to Gesell in his book *Vision, Its Development in Infant and Child,* vision is defined as "a complex sensory-motor response to a light stimulus mediated by the eyes but *involving the entire action system.*" The traditional comparison is to associate the eye with a camera. Like the camera the eye does have a shutter, diaphragm, lens and sensory film or retina. There, however, the comparison ends for the camera is a brainless instrument. Human vision is a combination of eye and brain. **We see through the eye but with the brain.**

Vision is more than sight alone. Hearing, smell, touch and memory all enter into vision. This can be demonstrated best by the example of having some unfamiliar object shown to you in the hands of some other person. The natural impulse is to say "let me see it" at the same time reaching out to take it in your own hands. Watch women in a department store, at the costume jewelry counter looking at earrings. The majority will take them in their hands to feel them. This reaction of adding touch to sight takes place from infancy on.

This carries over to the other senses as well. Having seen and held carnations heightens either one's like or dislike of a carnation scent in a perfume. All of us have heard many of the selections from *South Pacific* but I'm sure that those who have seen the play

have a heightened appreciation of the music after seeing the play. This has been shown in laboratory tests also. Gerard, Marshall and Saul in 1936 while studying the electrical activity of the brain found that the response to an auditory stimulus was increased while a light was shown into the eyes although there was no overflow of optic impulses into the auditory paths.

Memory, or experience, very definitely enters into vision. All actions and reactions of the human being are the result of the total of all past experiences. By the time we reach adulthood, no matter what we do—no matter how simple the action or reaction—it is based on past experiences. The muscular movements you made to reach the place in which you are now sitting, the body position you are now in—even the choice of where you are now seated—all these movements and decisions were colored by past experiences.

Any action or reaction if repeated often enough becomes a habit and is performed without conscious thought. Likewise if continued still longer it is probable that an actual change in body structure will take place if by such change the individual is better adapted to perform the desired task.

All stress brings about a change. Most of the muscles of the body are stronger than the demands that we put on them but the human body does not operate efficiently under extreme demands. When these stresses and strains occur often enough an adaptation or change takes place. Fatigue or strain does not necessarily bring about a sudden change.

Witness the tailor who sits on his table hand sewing. When he first takes up his trade he may only have a soreness in the muscles of his neck and back at the end of the day but see a tailor who has worked at his trade for years and you will see a round-shouldered man so skeletally altered that he cannot even walk erect.

Another unique example of the body changes brought about by stresses and strains is in the boom men in the log ponds. Old-timers at this craft develop a skeletal distortion resulting in changes both in bone and muscle from the repeated exertion of pushing at the logs so that they have an actual hump on the right upper side of their back in the shoulder area.

Every trauma brings about a change. It may not be sufficiently great to be noticeable after one such experience but if it is repeated often enough the change eventually will become apparent. This would apply no matter whether the trauma be physical, environmental or emotional.

Much is yet to be learned of the effect of environment on vision. We do know that man was intended to manipulate in space and yet our modern culture too often demands that our space world be confined to room distances and more and more of our tasks are within arm's length. This is having its effect.

Many studies have shown that myopia or nearsightedness is more prevalent in the urban areas. The most recent study is the one just published on a study of urban and rural children in Pullman, Wash., conducted by Dr. Francis A. Young of the Department of Psychology, Washington State College, Dr. Robert Beattie and others.

Vision is not all input. Look at any of the familiar optical illusions. The same light waves are reflected to each observer and yet what each one sees may differ radically. The "vision" that each one has depends on the intensity and variation of the impulses from other areas of the brain in addition to the light waves received.

More Than Meets the Eye

How does all this apply to the lighting profession? One of the pitfalls that the specialist in any field must avoid is the tendency to use his specialty as a peg to hang every human frailty on. In health care there is the allergist—to him every digestive upset, every skin irritation is an allergy. The internist may look in vain for some physical disorder when the trouble may be of emotional origin. Likewise the psychiatrist or psychologist may tend to place the blame for practically all physical disorders on a psychogenic basis. The vision specialist has to be on guard against referring all headaches to some visual malfunction.

Likewise it is possible for an illumination engineer to believe that rejects in production, employee unrest, visual discomforts all may be corrected by improving the illumination when some or many other factors may be the partial or entire cause. Visual difficulties, ventilation, noise or even a disturbing human element such as the personality of the foreman, poor employer-employee relations or even the parting remarks of the wife as the man left for work may all enter in to the causes of the complaints.

Just plain old monotonous surroundings can cause fatigue. We are just beginning to scratch the surface as to causes of fatigue. Fatigue is a strange thing. We have all experienced going home tired from work, determined to drop into bed right after dinner and then have some activity of interest come up for the evening and away we go, refreshed and having a wonderful time.

Reading requirements in the schools have increased rapidly in the past several decades and are still rising, yet in far too many instances we expect our youngsters to keep up with these visual demands of a jet-plane age and still only supply horse and buggy facilities in both school and home study areas.

In the majority of the school systems the visual ability of a child is still graded on his or her ability to read characters on the familiar Snellen Chart which is placed twenty feet away on the wall. Yet the visual demand is on the child within arm's length at his reading distance.

It isn't necessary to depend on such outmoded tests. Instruments are available that can be used by the teacher or the school nurse to screen out cases of visual fatigue in students that might pass the Snellen test with ease. Industry has found it profitable to use these modern screening devices. Why shouldn't we give our children the same advantage and thus make it possible for them to achieve better all through their lives?

With the knowledge that stresses and strains of whatever source do bring about changes in structure not only of the visual organs but the entire body then it behooves us to do whatever is possible to lessen these stresses. In lighting, if there is just one person to please then the correct lighting is that which makes him or her more comfortable. All rules to the contrary notwithstanding, if he isn't happy, he isn't going to be efficient.

In lighting for a group of people such as in a large office or plant the lighting must be designed for the majority. There is more to it than just sufficent illumination. Industry has found it beneficial to add harmonious color to the surroundings within plants and offices.

Classrooms can also be made a happier place to be. There aren't many adults who would willingly spend their days in as monotonous surroundings as exist in too many schoolrooms. A happy child is a healthier child, he can achieve more.

A child isn't going to come to us and say that he isn't happy in his surroundings. He is going to adjust to it the best way he can but he is going to pay a price for that adjustment because it takes energy to make it. The price may be in poor achievement, visual difficulties or in certain instances the results may be a so-called problem child.

Optometry is interested in preventive eye care. Anything that can be done to lessen undue stress in vision is a step in the right direction. In this the lighting profession is our ally.

"My Most Interesting Lighting Job"

C. C. Clardy
Rohr Aircraft Co., San Diego

Combined mercury and fluorescent on a 480/277 system was answer at Riverside Rohr . . .

Aircraft Factory

Strange to say we did not know where a new 200,000-sq-ft factory would be but knew its dimensions, 250x800 ft with roof trusses 20 ft above the floor and a comparatively flat roof. Ultimately Rohr Aircraft Corp. built it at Riverside. Work in it was to be fabrication of sheet aluminum and stainless steel, by scribing, cutting, forming, riveting, welding and assembly. We could not wait for an equipment layout but must proceed with a design of uniform distribution at an intensity level suitable to all departments. The flat roof smooth undersurface could be used as a reflecting canopy.

Bright reflective surfaces of aluminum and steel present glare problems, yet scribed lines can only be seen by the reflection of the bright edges of such lines. We were compelled to compromise between too much glare on surfaces and too little on the lines.

From experience we felt mercury lamps give the best quality light for seeing fine detail on metals. However it has objectionable color. In the past this has been balanced by adding incandescent lamps. Having chosen the combination for quality we decided upon a ratio of about 20% incandescent and 80% mercury, to get an intensity of from 75 to 100 f-c maintained. This required 200 lumens per sq ft for 200,000 sq ft and would take 1,000 kw of power.

To eliminate extra substations and heavy feeders we chose 480/277-v four-wire distribution and would take lighting directly from power feeders. This posed the problem of finding 277-v incandescent lamps. The more efficient fluorescent lamp could substitute if it would add the proper color to maintain rosy complexions. An experimental test in an isolated spot convinced me it would do.

Power for all operations other than spot welders is supplied by two 1,000-kw unit substations near the center of each half of the building. From each sub 800-amp, 480/277, four-wire, plug-in type bus duct runs in a straight line the 800-ft length of the building. Lighting units were mounted in a pattern conforming to the roof trusses, 20 ft on centers. Mercury lamps were mounted in pairs of 400-w units with Holophane prismatic reflectors. Standard RLM steel porcelain enameled 48-in. units were used for the pairs of 85-w fluorescent lamps. The two units alternated on the same circuit, four of each per circuit, a total load of a little over 4 kw per circuit. For mechanical strength Unistrut was used both for support and wireway for all circuits, eliminating many hanger supports. Each circuit is made up of eight units spaced 12½ ft apart attached to and suspended from the Unistrut which in turn contains two No. 12 wires, and averages 100 ft long.

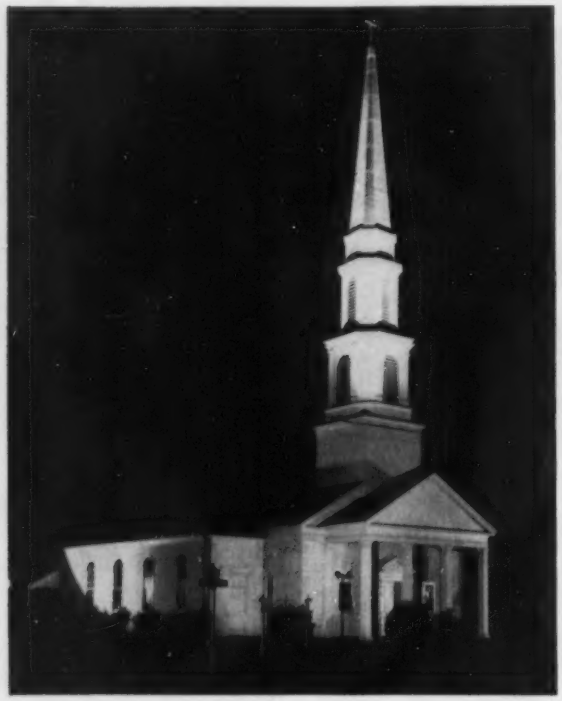
Operating switches are size 1 combination 60-cycle starters with 480/110-v control transformer and 20-amp current limiting fuses, overload relays deleted, with "on" and "off" push buttons in the cover. These are mounted in groups of four fed from a 70-amp, three-pole, four-wire breaker on the bus duct. Thus the subfeeds are seldom more than 15 ft long. For 110-v plug circuits for hand tools or local lights five banks of 45-kva dry-type transformers were installed.

Decision of our final plans was based mainly upon four factors:

1. Quality of light obtainable from the mercury lamp.
2. Liberal light on the ceiling from the prismatic glass fixture.
3. Saving of about 160 kw of connected load by substitution of fluorescent for incandescent; longer life and the higher voltage of the former.
4. Saving in first cost of an amount well up the scale of five figures by utilizing higher voltages and thereby eliminating duplicate transformer equipment, long feeders to panels and savings in copper in branch circuits.

George Twinning of Quinton Engineers Ltd., architects of the structure, did a fine job of dodging the steel work in steel trusses and braces for uniform rectangular 10x12½ ft spacing for lighting units. The finished job metered well over 100 f-c, the highest being 130 f-c in advantageous locations.

"My Most Interesting Lighting Job"



First Congregational Church in Phoenix is tastefully floodlighted

Church Steeple

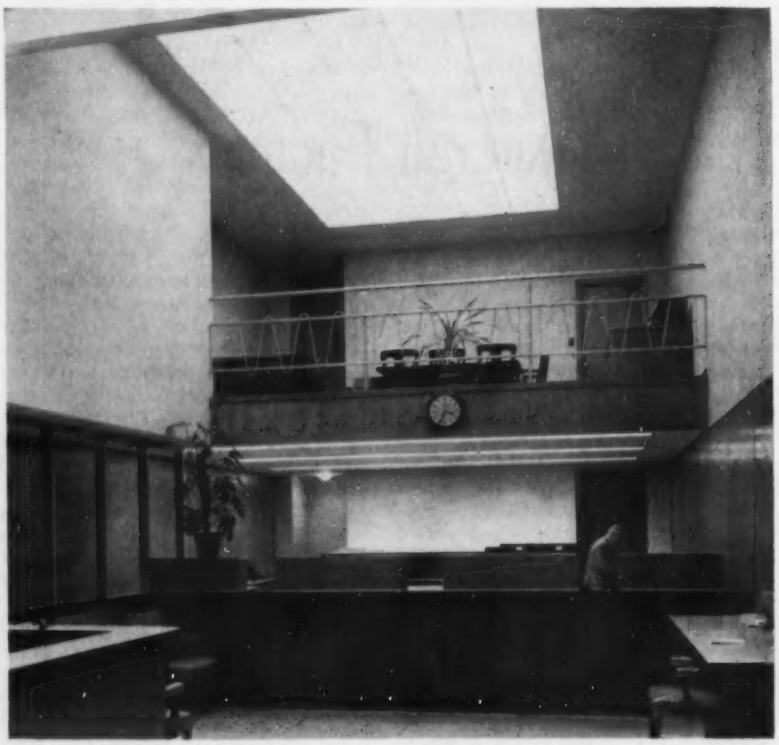
J. R. Williams
Arizona Public Service Co., Phoenix

With a steeple 104 ft from the ground and limited roof area the floodlighting of First Congregational Church in Phoenix was difficult. Even the churchyard, where the lighting units must be placed, was limited on the southeast and southwest sides. If placed at ground level they would be further subject to breakage of lamps, and would create glare conditions uncomfortable to pedestrians. Hence it was decided to mount PAR-56 lamp holders on 8-ft steel poles, 2 in. in diameter inside the sidewalks, 39 ft from the center line of the steeple. On each pole were two PAR-56 narrow beam (15x20° spot) 300-w lamps. The wide axis of the lamp beam was positioned on the vertical. Located in a residential area of low lighting levels an even gradient from 10 f-c at the bottom to 2 f-c at the top of the cross was obtained in this manner. This is sufficient to make the church and steeple stand out against the dark background of sky in a very satisfactory way. Reflectance of the upper part of the steeple, covered with sheet aluminum, was less than that of the white painted wood lower structure.

Small Bank

T. W. Beadle
Washington Water Power Co., Spokane

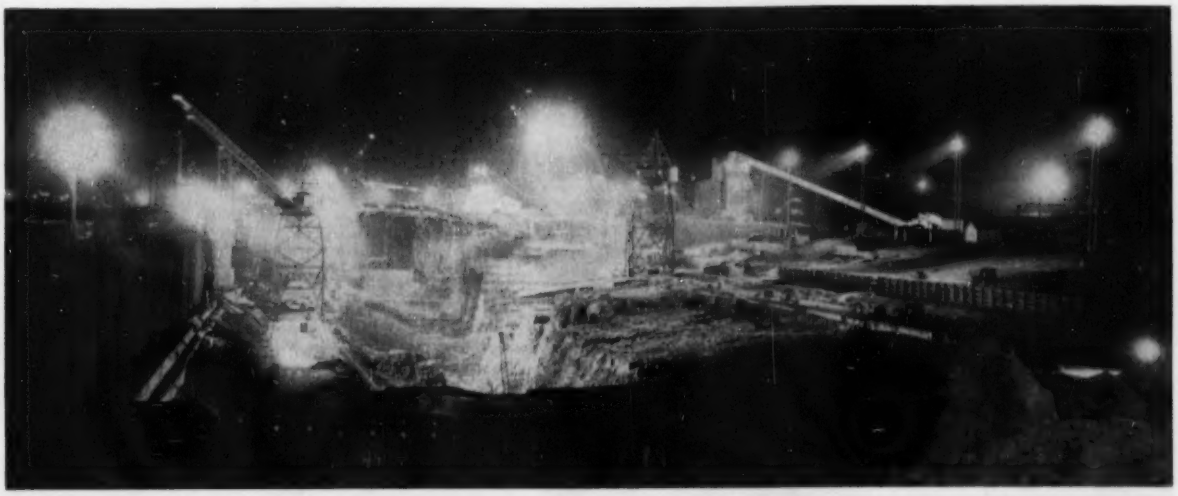
Three ceiling heights, 8, 14, and 18 ft, complicated lighting of this rebuilt small building, yet owner and architect were sold on 70 f-c minimum and an artificial skylight. The luminous panel section, 10x20 ft, must light balcony and main floor. By dropping the ceiling 2 ft, a coffer 10x20x2 made of plywood was installed and painted with 80% reflectance white. Five rows of bare lamp strips with two 2-lamp 75-w slimline and one 2-lamp 36-in. slimline per row were placed on the ceiling. Patterned polystyrene plastic panels 2-ft square formed the luminous element. Recessed fluorescent drop lens units were selected for the 14-ft ceiling portion and for the 8-ft ceiling under the balcony a flat low brightness lens was used. Light levels after three months use were 110 f-c at balcony level, 105 at tellers' windows, 100 in the work area behind them as well as in the officers' area to the front of the lobby. All are pleased with the new atmosphere.



Complicated ceiling problem solved in the remodeled Citizens Savings and Loan Society

"My Most Interesting Lighting Job"

D. E. Seely and K. W. Moore
Westinghouse, Portland



Units mounted on 90-ft structures on each side flood the working area at The Dalles Dam power house all night to facilitate the . . .

Around-the-Clock Construction

Job requirements for round-the-clock construction by The Dalles Powerhouse Constructors to meet completion dates indicated:

1. A minimum level of 2 f-c maintained in the active construction area.
2. An expected service life of the installation of from five to seven years.
3. Lights would burn from dark to daylight, seven days a week.
4. Atmospheric conditions would be dusty.
5. Maintenance would probably be only fair.

The power house structure is being built on an island of rock in the Columbia River. A coffer dam holds back the river during excavation and construction. The schedule called for lights installed first on the Washington side to permit excavation to bed rock, including blasting. Following this material would be handled by four Whirley-type cranes requiring a minimum of 100-ft clearance from track center.

As a general plan it was decided to mount luminaires on wooden structures approximately 350 ft from the centerline of construction on the Washington side to serve excavation and construction. Following excavation additional lights on similar structures would be mounted on the coffer dam and directly to the Whirley cranes as brought into use.

The area was divided in three sections. First, or construction area, 1,480x280 ft, lying between the two crane tracks. Second, or work area, included the construction area plus a strip 100 ft wide outside the crane tracks. Third section could exist anywhere in the area and was designated as the pour area, between any two opposite cranes, approximately 200x100 ft wide. The construction contract called for an average maintained foot-candle level of 2, but IES recommended levels called for 2 f-c for excavation but 10 f-c for construction. Values of 2 f-c were selected for section one, 1.5 for section two work area and 8 f-c for section three or pour area.

Calculations indicated the best results would be obtained by using IES Class GP luminaires with Type II distribution, mounted on 90-ft wooden structures on the Washington side and Class GP with Type III distribution on similar structures on the Oregon side. Those on the Washington side would have impact-resisting cover glass for added protection. Units on the Whirley cranes would be Class GP with Type III distribution. All units would use 1,500-w PS-52 general service lamps burned at rated voltage.

Final design accepted, the installation was made by Donovan Construction Co., electrical member of The Dalles Powerhouse Constructors and energized in September 1953. There are five 90-ft H-frame structures with 24 units each on the Washington side. There are five groups of 24 units each on the coffer dam. The units were mounted on a structure that started at the level of the coffer dam and increases in height as the project progresses until a final height of 90 ft is reached above the coffer dam. Twelve more units were mounted directly on each Whirley crane.

Photometric measurements taken in 1954 showed these results:

Section one, construction area, 2.5 f-c average.

Section two, work area, 1.7 f-c average.

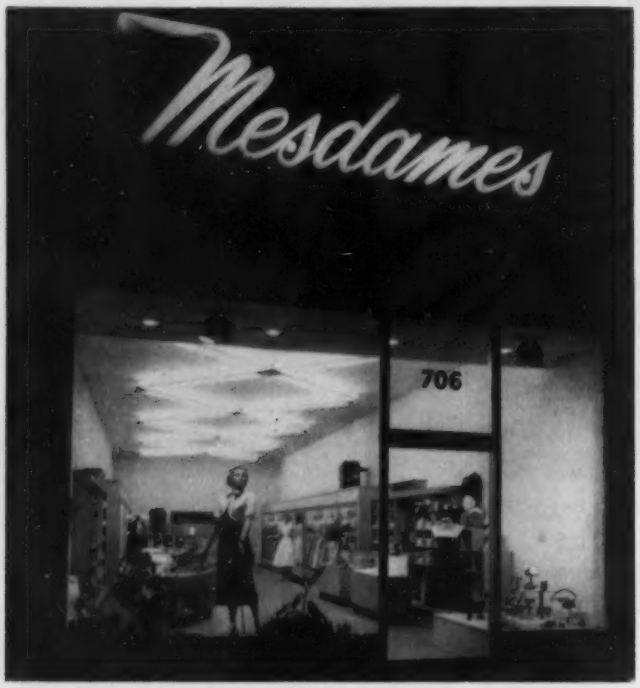
Section three, pour area, 5.5 f-c average (one crane only).

The results satisfied the contractural requirements and exceeded the design values slightly.

Donovan Construction Co. reported that "as of June 28, 1954, there had been no serious accidents on this job at night." This record was accomplished even though all pouring of concrete is done after dark and at maximum speed.

The engineering of this problem was done by D. E. Seely, lighting sales engineer, Westinghouse Electric Corp., and K. W. Moore, field sales supervisor, lamps and lighting, Westinghouse Electric Supply Co., both of Portland, Ore.

"My Most Interesting Lighting Job"



Diamond pattern of the ceiling units is an attractive decorative note

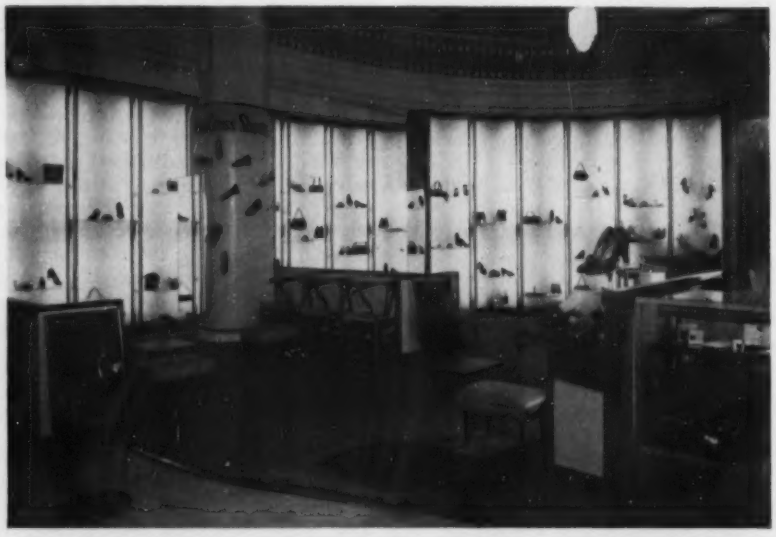
Apparel Shop

David F. Curtis
San Diego Gas & Electric Co.

Mesdames, a small apparel shop in Oceanside, I hoped would be a modern approach to a relighting problem. Usually customers run continuous rows but here the fluorescent units were arranged diagonally to form four hollow squares in a series of diamond shapes. Later the counters were also turned to fit the ceiling pattern. Incandescent spot units are fitted into the angles at the junction of the fluorescent units down the center. There are 16 two-lamp fixtures with 430-ma ballasts and de luxe cool white lamps. This not only provides an interesting pattern but the diagonal mounting gives distribution from different directions, minimizing shadows. The adjustable spots provide flexible accent light on selected merchandise. Store interior is 20x70 with a 12½-ft ceiling. Walls are light green, ceiling likewise and floor is gray. General illumination averaged 55 f-c. The owners say its $1,400 cost was the best investment made.

Shoe Display

B. J. Sabaroff
Architect, San Francisco



Wall of light draws shoppers' attention to the shoe display even at the rear of the store

The problem was to create an interesting and attention getting display of small items—shoes and purses—in Livingston Bros. store, San Francisco, despite the distraction from existing ceiling fixtures, a multitude of store fixtures and other merchandise. The display, at the rear of the floor, must be seen at a long distance so that shoppers would be tempted to come closer for more careful investigation.

The solution, illustrated at right, was to create an entire display wall of light, not only attractive of itself but that highlights the merchandise as well. This was done by mounting standard Garcy 4500 showcase reflectors vertically about six inches in front of a series of slightly concave panels that act as reflectors. Each showcase reflector has inside it one 64-in. and one 42-in. slimline lamps, at 300 ma. The shorter sections over the stock cabinet have one 64-in. only. Brightnesses: behind reflector 65 f-l; between reflectors 28 f-l; metal surface of reflector 7 f-l; purses, black leather 1, suede .7, red leather 1.7, brown leather 1.2; shoes, black 1.2, brown 1.3 and red 2.5 f-l. Intensities, behind reflector 95 f-c (vertical), between reflectors 32 f-c, purses 7.5 f-c and shoes, from 12 to 13 f-c. Electrical contractor was Lemoge Electric, fixtures from Kjaer Equipment Co.

"My Most Interesting Lighting Job"

James H. Flora

Southern California Edison Co., Ontario

Metal louvers at the windows control daytime sky brightness, glare. Corridor lighted by Skylike troffers using 200-w silver bowl lamp

Small Branch Bank

To follow the modern concept of banking by providing an accompanying modern lighting system was the objective at the E Street branch of First National Bank of Ontario, Calif.

Located on a southwest corner with front facing east, large windows face east and front, with smaller windows 6 ft above floor level along the north. Sky brightness and glare are controlled by metal light control louvers on the exterior that may be operated from the inside, rotating 180°, thus giving a flexible daylight control. Inside, the arrangement was designed according to tasks.

The public lobby area with a 12-ft ceiling is delineated as separate from the work area by a ceiling there of 10 ft 8 in. Since there are no prolonged tasks in the lobby area a pleasing appearance was provided with recessed flush Sylvania Flexi-Module louvered sections 32-in. square above which are reflected units, two per row over the louvered sections. Rows were spaced 10½ ft on center and 5½ ft from side walls. With T-12 Coolwhite slimline lamps 35 f-c was attained with a pleasing appearance.

In the officers' and tellers' work section more thought was directed to providing quality as well as quantity of illumination since the tasks performed here were more prolonged and varied. Two continuous rows of surface mounted Sylvania units louvered for 45° shielding, lamped with four Coolwhite slimline lamps per fixture, were spaced 10½ ft on center and 5½ ft from the side wall. Average illumination here is 100 f-c; brightness ratios are 2 to 1 between task and surroundings, 7 to 1 between task and remote surfaces and at no point exceed 40 to 1, recommended maximum. In a rear entrance corridor are surface mounted Smoot-Holman Skylike fixtures, 12 ft on center, with 200-w silverbowl lamps. Architect Roy Kazebier of Ontario and Citrus Electric of Cucamonga, contractor, gave complete cooperation that helped make the installation a complete success.

Work area has 100 f-c from two rows of louvered four-lamp slimline Coolwhite lamps

"My Most Interesting Lighting Job"

With color and reflectances in walls and ceiling, brightness is kept in good balance

Embryo dentists can see the fine detail necessary for duplicating dentures and teeth

Dental Labs

at Phoenix

Bevan Jones
Arizona Public Service Co.

Work in a dental laboratory is done on white plastic, porcelain, plaster, gold and silver. In order to attain high levels of illumination needed for close work the brightness contrast between working surface, work and other components within the room must be kept at a minimum yet give some contrast in color so as to give the room warmth.

Hence at Tri-State Dental Laboratory in Phoenix four-tube NuLite louvered fixtures in continuous rows were used as shown. Lamps were 96-in., 3,500° white slimline. Desks were painted light grey, wall pale green (60% reflectance), floor a pale tan (40%) and ceiling flat white. Desk tops were of white Transite.

at San Francisco

C. J. Selby
Pacific Gas and Electric Co.

Similar conditions were to be met at College of Physicians and Surgeons in San Francisco, except that it was a relighting job rather than a new installation. Previous equipment gave low intensities and were glare sources and all dental work, such as making of inlays, crowns, bridges, casting and polishing, was hampered by inadequate light. Color and light intensity were important in matching teeth and in baking of porcelain teeth.

The room was approximately 65x30 ft. Installed were 48 luminous direct reflectors with translucent plastic side panels and traverse louvers on 4- to 5-in. centers. Each was equipped with two 96-in. T-12 slimline lamps operated at 430 ma. Lamps were standard warm white. The fixtures give 25% illumination in the upper level, 75% downlight. Mounting height was 7 ft 6 in. above the floor. Ceiling and upper walls down to 7 ft above floor was painted flat off-white; wall surfaces below that pastel grey green of 60% rf. Bench tops were recovered with light grey linoleum. Foot-candle reading was 70. Globe Electric Co. made the installation.

"My Most Interesting Lighting Job"

Del Reynolds

Southern California Edison Co., Alhambra

San Gabriel's Las Tunas Boulevard now and before

Relighting Revives

When the merchants of San Gabriel had a survey made of the needs of their community, high on the list was improved street lighting. They found that the merchants were getting less than 20c out of every dollar spent by the city's residents. Las Tunas Boulevard, the main street, was merely a thoroughfare to siphon off business to the east or west.

The existing ornamental system gave less than 1/10 of a foot-candle directly under the standards, with an average of 3/100 f-c for the boulevard. The fixtures, installed in the 1920s, operated half on all night and the balance off at midnight. Spacing ran from 80 to 120 ft. Width of the roadway was 70 ft.

To modernize, the merchants decided to raise the money on a per front-foot basis. Size and type of luminaire was left to the consulting engineers. To determine the type a study of vehicular and pedestrian traffic at various hours was made. It could be classified according to IES "American Standard Practice for Street and Highway Lighting" as heavy vehicle and light pedestrian traffic.

A study of existing underground cable insulation disclosed that if the system were divided into four separate circuits the insulation would be well within the required safety factor to carry 20,000-lumen mercury units on all of the 110 outlets. A switching point in the center of the system was located where the existing system could be mechanically grounded at a sufficient number of locations to divide the outlets into four separate all-night circuits.

Serious consideration was given to 20,000 mercury units on 30-ft mounting heights, which would give very nice street illumination but would light up the general area to a very high intensity. Yet here 40% of the buildings were old residences, churches or country club property that would not aid the merchants by being brilliantly lighted. It was felt that a 25-ft mounting height would introduce sparkle to the street from the luminaire itself, much as bare lamps do to used car lots.

This mounting height, according to the IES standard, with 10,000-lumen mercury luminaires, is satisfactory with a type IV distribution pattern. This isolux pattern, projected on the street width and outlet spacing, would give even distribution. The IES publication tells of two types of glare, one to be avoided, the other that might be termed inherent ballyhoo brilliance of which we wished to take advantage. Further, the 10,000-lumen size would result in a saving of over $1,100 a year in utility bills to the merchants.

Conditions along the boulevard at this time did not justify the 20,000-lumen lamps. Instead it was recommended that 10,000-lumen lamps at 25-ft mounting height with type IV distribution pattern luminaires made by Line Material Co. be used. This system was installed and at some future date can be changed to a 20,000-lumen installation without much work on the underground system.

The installation was completed before Christmas 1953. Merchants reported a 12% increase in business along the street, even for February, which was contrary to regional trend. Police records of accidents and crime compared to the previous like period show a reduction in both. Saving from this alone is worth about $1 per capita to a city. The job, over one mile, at a cost of $2.80 per front foot, delivers ½ f-c at street center.

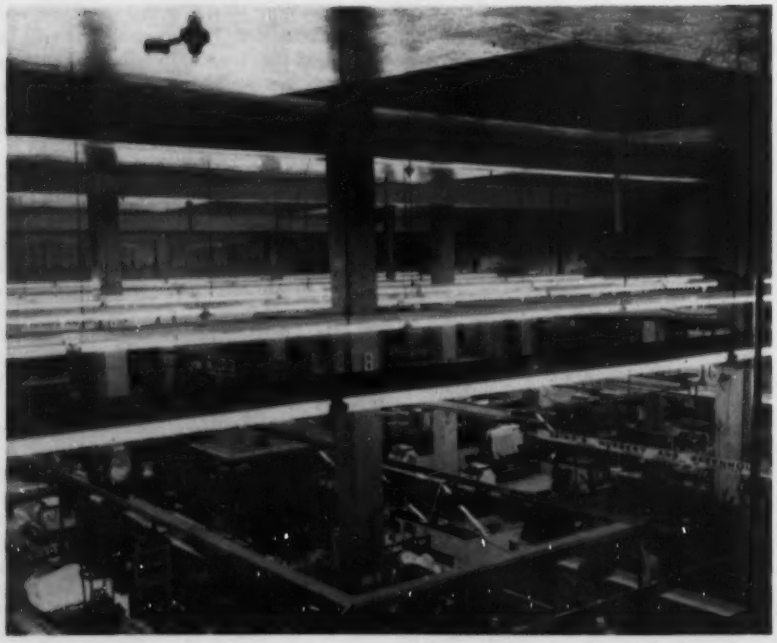
Electrical West—Vol. 113, No. 3

"My Most Interesting Lighting Job"

Joe H. Shelley
W. D. Grasle Co., Portland

No attempt to convert it to a modern supermarket but to increase over-all lighting at . . .

Farmers' Market



Various existing ceiling levels were brought together by uniform mounting heights of the fluorescent lamp strips. Cool white de luxe lamps gave the desired color for most areas

Since its conception approximately 25 years ago, the Farmers' Market Inc. of Portland, Ore., has grown from a few sidewalk stalls into an area that now covers half a city block. This area consists of what was once three separate buildings remodeled to the extent that the interior partitions have been removed within structural limitations. The end result is an area having two floor levels differing by approximately two feet and three separate ceiling heights. This general area is divided into open stalls, individually leased and operated, which handle a variety of merchandise such as fish, meat, poultry, produce, knickknacks, groceries, flowers and plants, bakery goods, etc.

Although the market operation has grown, the over-all lighting has not kept pace. When the W. R. Grasle Co. was called in to make a survey of the lighting problem, approximately fifty 500-w RLM-type reflectors, reduced to 300 w because of an overloaded electrical system, were giving in the order of 5 f-c of illumination. This had been augmented in many cases by the individual stall operators who had installed a hodgepodge of supplementary lighting that produced a fairly high level of illumination—75-100 f-c—at the display level.

It was decided that the main objective was to increase the over-all lighting to give a good value of illumination by present standards and still retain the identity of the Farmers' Market as such. In other words, we would not attempt to give the appearance of a supermarket in an atmosphere that was far from modern.

The final result was achieved using 200 two-lamp, eight-foot slimline fixtures of the bare-lamp design. These were mounted 13 ft above floor level in continuous rows on 10-ft centers, which gives approximately 50 f-c maintained.

Aside from installation problems, which were varied and many, the main lighting question was that of color rendition. Because of the wide variety of merchandise displayed, we found it impossible to satisfy everyone involved. After considerable experimentation, it was decided that the cool white de luxe lamps gave the best over-all rendition, with the exception of the grocery section (primarily canned and packaged goods) where standard warm white lamps were installed.

The completed installation is very pleasing. The increased lighting provides a high degree of attraction. For the higher values needed on some displays, the existing supplementary lighting serves quite well.

"Interesting" Contest

Three winners from the West's three regions will have their entries presented at the Illuminating Engineering Society's technical conference Sept. 13-17 in Atlantic City. These winners are: L. M. Bailey, Albert Sechrist Mfg. Co., Denver, winner of the Intermountain Region contest, with the relighting of Denver National Bank (see EWEST, July 1951, p 66); S. V. Monsees, city of San Diego, winner of the South Pacific Coast Region's contest, describing the floodlighting of the California Building Tower in Balboa Park, San Diego; and E. E. Ackland, Vancouver, B. C., for lighting of St. Anselm's church. IES denies us the privilege of publishing these winners' entries.

In the preceding pages will be found the entries of other contestants in the three regional contests. Other entries were not received in time for this issue. These included one by C. W. Jarrett, Portland GE Co., on color lighting for lumber grading and another by R. W. Preston, consulting engineer, on the McNary Airport runway lighting.

The winner of the Puget Sound Section, Gerald Fitzmaurice of P. A. Travis & Associates, Seattle, was a description of a luminous ceiling installation at the Paramount Parks school for which pictures were not available.

There were eight entries in the Northern California Section out of which three were presented at the runoff meeting March 18. Winner in that contest was Sy Hughes of F. K. Pinney Inc. for the lighting of a barber shop. C. W. Macy won second prize for Velvetone's luminous ceiling.

Because of its interesting treatment of a display problem, the Sabaroff entry is featured in the preceding pages; Carl Selby's laboratory lighting, also.

Second prize in the Rocky Mountain regional conference went to J. Richard Williams of Arizona Public Service Co. for a description of the lighting of the First Congregational Church steeple in Phoenix (see p 78). Second prize in the Arizona Chapter went to Bevan Jones of the same company for lighting of a dental lab (see p 82). Other contestants were Arvel E. Hamby, Motorola Research Co., whose entry will be published later, R. W. Godemann, Bill Savoy and Milo White of Arizona Public Service Co.

Two of the winners in the Southern California Section are presented here. They were first and third prize winners. That of Pat Kelly, second prize winner, was not available.

Two other San Diego Chapter entries are on p 77 and p 80.

At Arizona Chapter's IES contest: Stan Burnham, chapter chairman; R. E. Tweedy, contest chairman; Dick Williams, first prize winner, and Bevan Jones, second prize winner

At San Diego IES Chapter panel was C. C. Clardy, chairman, and speakers T. J. Erchul, city schools architect; Robert Ford, Smoot-Holman Co., and Leonard Hobbs, Smoot-Holman president as well as regional vice-president of IES. The subject was school lighting

Winners of Southern California Section IES contest were Jim Flora, third, Pat Kelly, second, and Del Reynolds, first prize, and with them Section Chairman Don Prideaux

Northern California Section "My Most Interesting Lighting Job" contest winners Charles Macy, second, Sy Hughes, first, Bernard Sabaroff, third, with Steve Lindheim in charge

In either commercial or industrial installations like this drafting room, designed by the author for the PG and E Co. building annex, there is more to engineering of discharge lighting than foot-candles and lumens. The engineer must know his ballasts and the . . .

ELECTRICAL FACTS OF LIGHT

H. L. Gerber* Electrical Engineer, The Coddington Co., San Francisco

Previous to the introduction of fluorescent and mercury vapor lamps the design engineer had only the incandescent lamp to worry about and life was comparatively simple. With the incandescent lamp current flow was limited by the resistance of the wire filament and by the design and adaptation of switches and circuit-interrupting devices capable of withstanding increased currents needed in the initial heating of cold filaments.

But with the advent of fluorescent or electric discharge light sources new and more complex conditions arise. To meet the current control and voltage conditions these sources require an auxiliary device known as a ballast and this is where the engineering really enters.

The important part to remember about fluorescent lamps and their ballasts is that as the current passes through the fluorescent lamp the resistance of these gases to the current flow is steadily decreased and unless this flow of current is checked or stabilized, the steady increase of current would soon destroy the lamp, together with all other factors necessary for the proper design of lighting installations. So in order that lamps of this type may operate at the rated current and voltage for each specific type of lamp, a current and voltage limiting ballast was designed for each specific type of lamp.

The simplest form of ballast that is used for operation of fluorescent lamps on direct current is of the resistance type, a very inefficient and terrific heat-producing device. But as very little direct current is used in areas where alternating current is supplied, the inductive-type ballast is universally used. This magnetic-type current-stabilizing unit produces less heat than a resistance-type unit and the total ballast losses vary from 10 to 25% of the total power passing through the ballast.

For practical purposes, there are about six manufacturers engaged in the manufacture of ballasts for lamps. Some manufacturers have a listing for as many as 127 different types of ballasts. Each ballast is to be used for a specific lamp or combination of lamps, or for a specific installation of the

* Experienced both as San Francisco's chief electrical inspector and as construction design engineer, with a great variety of jobs to his credit, Harold Gerber gave this advice at the South Pacific Region IES conference in San Francisco, April 20. He is presently recuperating from a breakdown of his own, caused by overextending his boundless drive.

same lamp, which in many cases operates under different temperatures or humidity conditions.

There is also a difference in manufacturers' products. From field experience, the most publicized name of a ballast manufacturer is not always a guarantee for an efficient, noise-free, or non-radio-interfering type.

Power Losses

Both for design of lighting installations using lamp ballasts and for the design of heating and air-conditioning equipment, it is always necessary to know the exact over-all power consumption of both the ballast and the lamp.

For straight lighting installations in office buildings or commercial building installations wherein connected loads are largely lighting, operating on circuits or feeders with power factors at near or slightly below unity, the tables of the manufacturer are used for average load calculations. For example:

Single Lamp Ballast—96-in. T12, 425 ma

Make	Lamp Wattage	Approx. Watt Loss
No. 1	73	25
No. 2	73	27
No. 3	73	27
No. 4	73	27

As these four companies manufacture the majority of ballasts or the specifications are limited to these four manufacturers, it is safe to assume and estimate that the line load or power consumption of a single lamp—96-in. Type T12, 425 ma—is 100 w.

For two-lamp installation the previous named power consumption is not obtained with a multiplier of two. Before loads can be accurately estimated, it is essential to select the proper type of ballast, taking into consideration the installation temperature conditions, humidity, quietness of operation for the particular location and the proper installation of the ballast relative to ventilation and convection of heat away from the ballast enclosure. These conditions aid in the selection of the ballast and this specific power loss is added to the lamp wattage, the summation being the total required.

If filters are added for each lamp, additional power losses of approximately 1.50 w per lamp can be figured but for all practical estimating purposes they can be disregarded.

Cold Cathode Lighting Ballasts—Are for two types of lighting installations; one for a cold cathode lighting fixture with individual or groups of cold cathode fluorescent lamps and the other for cold cathode luminous tube installations.

The lamps are usually of three types: 750 v—120 ma for 4½ mm pressure; 835 v—120 ma for 6 mm pressure; 200 ma sequenstart for 6 mm pressure lamps. Lamps are 93 in. long, 25 mm diameter. The ballasts are power factor corrected close to unity and do not vary in power factor on a two-lamp unit even if one lamp is inoperative.

Ballast losses are comparable to other types of fluorescent lamp ballasts. Capacitors are usually of the ventilated types, which reduce ambient temperatures within the ballasts, resulting in longer ballast life.

Ballasts for Operating Luminous Tubing—This type is often used in coves and other types of outline design where it is impossible to use standard straight line light sources. This was our first applicable source of fluorescent lighting.

The ballasts or luminous tube transformers operate on secondary voltages with a maximum limitation of 15,000 v and 4,500 va. Their installation is not as a part of an approved fixture enclosure as is the case of the usual fluorescent lamp ballast. Their complete installation should be made to conform to the provisions of the National Electrical Code. The complete grounding of the transformer cases and midterminal points is a "must" in their installation.

Ballasts are made both for normal operation at approximately 50% pf and for high-power factor of 90%. The 90% pf type is required by all utilities for installation in California. Ballasts should be selected by type for their specific installation. There are usually two types, the outdoor and the weatherproof types. Outdoor types may be installed in damp or moist locations subjected to weather, but must be installed in a ventilated raintight enclosure. Weatherproof types are for installation out-of-doors without additional enclosures, but are not usually power-factor corrected and require additional capacitor power factor correction.

Average Power Losses with PF Corrected Ballasts

General Line Fluorescent Lamps—40 w and above, operating a single lamp

110-125 v ballast	Approx. 25 %
267 v ballasts	Approx. 37 %
480 v ballasts	

Two-lamp Ballasts

2 40-w lamps, 110-125 v	Approx. 22½ %
2 40-w lamps, 208 v	Approx. 17½ %
2 40-w lamps, 267 v	Approx. 21½ %
3 40-w lamps, 110-125 v	Approx. 19.2 %
3 40-w lamps (some mfgrs. 95 % pf)	Approx. 17 %
3 40-w lamps, 267 v	Not available

Germicidal Lamps—110-125 v ballasts. The wattage of these types of lamps varies between 4 and 36 w, ballasts for 4 to 15 w operating on power factor not in excess of 55 %

2 30-w lamps	Watt loss 30 %
2 36-w lamps	Watt loss 44½ %
1 16-w lamp	Watt loss 56½ %

Rapid Start Ballasts—Series lamp operation. All 2- and 3-lamp units operating in series, 60 cycle a-c

1 40-w, 120-v, F40-T12RS	Loss 30 % of lamp watts
2 40-w, 120-v, F40-T12RS	Loss 21 % of lamp watts
2 40-w, 208-v, F40-T12RS	Loss 23.7 % of lamp watts
2 40-w, 267-v, F40-T12RS	Loss 23.7 % of lamp watts
2 F-100, T12RS	Loss 22½ % of lamp watts

Slimline Ballasts—50 Separate Types, One Manufacturer

For 110-125-v ballasts	
1 96-in. 73-w, 425 ma, 27 w	37 %
2 96-in. 73-w, 425 ma Lead Lag, 32-35 w	24 % New
2 96-in. 73-w, 425 ma Series Seq, 28 w	19.2 %
For 2 73-w lamps, 96-in. 425 ma, 240-250-v ballasts, Series Seq only, 30 w	Loss 20.5 %
2 73-w lamps, 96-in. 425 ma, 267 v, 32 w	Loss 20.5 %
480-v ballast, 2-lamp	Losses same as for 240-v ballasts
1 lamp, 267 v, 25 w	Loss 34.5 %

40-w Instant Start—High Voltage
Not to be used in ambients below 50 F S.S.

1 40-w, 110-125 v, 20 w	Loss 50 %
2 40-w, 110-125 v, 28 w	Loss 35 %
2 40-w lamps in series, 22 w	Loss 27.5 %
1 40-w, 220-250 v, 17 w	Loss 42 %
2 40-w, 220-250 v, 28 w	Loss 35 %

Circline Lamps—Are not commonly used except in special locations in offices. They have an average power loss of 26 %. Most noticeable is the 8¼-in. diameter lamp, with 22-w rating and 14-w loss of 59 %.

"Major problem for an engineer is to see that he gets materials truly equal to those specified"

Mercury Vapor Lamp Ballasts—Because of greater efficiency and more lumens per watt output mercury vapor lamps are rapidly replacing other types of indoor and outdoor lighting. In industrial installations, where high mounting heights are obtainable, greater light output is obtained with a lesser number of fixtures.

Since mercury vapor lamps are of the gaseous discharge types, ballasts are required to provide proper voltage and amperage for starting and normal operation.

Ballast types include those for normal operation, high power factor for installation on multiple circuit 120- or 240-v operation and for series lighting circuits at 6.6-, 7.5- or 10-amp operation.

Ballasts must be selected for indoor or outdoor operation. Multiple circuit 400-w ballasts, where installed in ambient temperatures below 20 F, require a transformer having a secondary open circuit voltage of not less than 300 v.

Power Losses—The power losses for mercury vapor lighting ballasts vary with approximately 20 types of lamps and ballasts.

For 100-w lamps type AH4 and BH4, ballast losses 20-w or 20% lamp wattage.

For 250-w, AH2, AH5, CN5, ballast losses 40-w or 16% of lamp wattage.

For RS SunLamps, direct operation, 125-v circuit without ballast losses.

For all types of 400-w lamps, 40-w ballast loss or 10% of lamp wattage.

For 1,000-w lamps, 85-w loss or 8½% of lamp wattage.

For 3,000-w, H9 lamps, 165-w loss or 5½% of lamp wattage.

Starting and Restriking Times

Two of the disadvantages of straight mercury vapor lighting are starting and restarting time. It requires, depending upon types of lamps installed, from three to seven minutes for a point to be reached for stabilization of vapor pressure. At the instant the circuit is closed and the arc strikes, the current is high and the voltage is low. Normal values are delayed during these starting periods of minutes until a point is reached at which current is normal and the voltage rises to maintain a stabilized vapor pressure.

This point is very often overlooked. Just as motors and similar devices having inherent starting characteristics require increased circuit feeder and conductor sizes in proportion to these starting currents, so must the circuiting designed for mercury vapor lighting installations in order to obtain minimum starting time.

Lighting circuits are classed differently from motor circuits. They may be installed as 15-amp, 20-amp, 30-amp and 50-amp circuits, the size of circuit conductors and the maximum circuit overcurrent protective devices being the limiting installation factors.

For standard lighting circuits, in industrial use, a 400-w incandescent lamp, operating at 120-v, would require 3.3 amp and for industrial use (using 80% of 30 or 24 amp) seven of said lamps could be placed on a 30-amp circuit with 30-amp overcurrent protection.

But using 400-w mercury vapor lamps, with a starting current of 5-amp for from four to seven minutes, only five of said lamps and ballasts can be placed on a 30-amp circuit.

Where large numbers of these lamps are installed these added starting currents result in increased feeder and control switching sizes, and increased transformer and service facilities.

Restriking Time—In localities where there are interruptions in power service or where voltage fluctuations occur, a voltage drop of more than 15% will extinguish the arc. Then all such lamps are out of service. Depending upon the ambient temperature of the lamp, the lamp must cool sufficiently in order to reduce the vapor pressure to the point where the arc has sufficient circuit voltage to restrike the arc—any time from four to ten minutes—depending upon available circuit voltage.

This can result in a partial or major shutdown of work until the lamps are operating again.

Other Factors Concerning Ballasts

The proper installation of fluorescent fixtures requires that the ballasts be selected for the proper type of installation, relative to voltage, frequency, type of ballast, location relative to ambient temperatures, mounting conditions of ballast within fixtures, mounting conditions of complete fixtures, method of fixture wiring, noise factors from ballasts or structures, ventilation of ballasts, radio and feed-back interference values, power factor of ballasts, power factor of circuits or system for supply, type of primary and secondary supply systems, etc.; all are important.

Over-Voltage—The system voltage should not be in excess of 120-v for practical purposes. Capacitors do not produce harmonics but they may reduce or increase harmonics, depending upon the particular conditions. One of the major sources of harmonics is transformer magnetizing current. Third harmonics are usually circulated in delta-connected transformer windings and are usually of no consequence. In wye-connected secondary systems, where overexcited ballasts result from overvoltage, the harmonics will increase and for a 10% overexcitation the fifth harmonic will approximately double.

Where a normal load is balanced on a three-phase four-wire system, the neutral conductors carry little or no load. On overvoltage, ballast or transformer circuits operating with third or fifth harmonics increase the neutral currents. These rise to the arithmetic sum of each ballast current value. This results in neutral conductors carrying full current loads when no loads were contemplated. This is detrimental to ballasts, capacitors, and increases the power losses throughout the entire system.

Lead or Lag Ballasts—The use of lead or lag ballasts depends upon the following factors, each to be considered separately:

1. Over-all cost of fixture, resulting from ballast selection.
2. Additional weight factors.
3. Power losses.
4. Location of ballast in fixture relative to ventilation, ambient, raceway dimensions, mounting provisions.
5. Hum factor of ballasts, location of fixture.
6. Stroboscopic effects.
7. Manufacturer's contentions.
8. Servicing and lamp renewals.

The series-sequence ballast averages about 11% less cost than a lead-lag ballast, or approximately $1 per ballast.

The initial economical cost of series-sequence ballasts, the smaller dimensions and their weight factors have given rise to many claims and predictions for this type of ballast as well as contradicting claims from different manufacturers.

Today the lead-lag ballast manufacturers, as a result of such claims for slimline series-sequence ballasts, are designing lead-lag ballasts of practically the same dimensions and weights and have reduced the power losses to a point within 14%. Whereas a two-lamp, 425 ma S.S. ballast requires 98-w, the new lead-lag ballast requires 32-w.

Fixture ballasts should be located in the ballast raceway in a firm, struc-

turally secured method to prevent magnetic vibration, with as many sides of the ballast as practicable in contact with the fixture channel for the conduction of inherent heating away from the ballast.

In dust-free and dry areas ventilation of a fixture housing by means of louvers is needed.

Ample wiring spaces so that conductors do not contact the ballast or prevent air circulation within the ballast raceway should be provided.

The painting of fixture interior raceways with dark nonmetallic finishes increase radiation of heat.

In many cases, where ambient temperatures are excessive, as in cases of restricted types of flush fixtures or in radiant heating in ceilings or floors above fixture installations, it will be necessary to place ballasts remote from fixtures in a cooler location.

Noise—Every ballast has a normal magnetic hum, but some ballasts are noisier than others. This hum originates from magnetic action in the core and coil of the ballast and the type of magnetic assembly, based upon the size and construction of the ballast.

The amplification of any existing ballast hum depends upon: the proper mounting of the ballast within the fixture, fixture design, fixture mounting and installation, proper securing of circuit and raceway connections, proper grounding of fixture and supporting device, the ambient noise level, resonant qualities of the ceilings, walls and furniture and equipment within the area.

In many cases you obtain exactly what you pay for. A well-constructed ballast of proper flux density, rigid core and shell construction, minimum stray leakage, proper coil bracing, and nonconductive varnish impregnation of the entire assembly, both core and coil assembly, impervious to excessive heat or moisture absorption, are factors in securing a ballast with minimum noise or hum factor before considering other amplification problems.

The ballast, together with the specific type of location for installation, determines the hum factor to be considered. In selecting ballasts, the hum factor required should be specified.

Stroboscopic Effects—From practical experience it has been found that in industrial installations where lighting is installed on or about the working spaces of moving machinery and equipment, selection of fluorescent lighting fixtures and ballasts should be such as to minimize the stroboscopic effect from the lighting system. It has been found that the lead-lag type ballast is superior to the series-sequence type ballast for this particular feature.

Photometric curves showing output from the lamps of fixtures having one or the other types of ballast immediately determine the difference between these two types of ballasts.

It is true that with series-sequence ballasts, if installed on a three-phase four-wire star-connected system and so arranged that the lighting from one fixture overlaps the lighting of the adjacent fixtures and these adjacent fixtures are installed on the different phases of the three-phase system, this particular feature can be eliminated. This condition cannot always be met inasmuch as all fixtures are not designed for three-phase four-wire raceway provisions and in most smaller types of industrial plants power is derived from a single-phase of a delta-connected distribution system.

In many cases it is far better to install the lead-lag type ballasts in lieu of the series-sequence type. In a single run, of perhaps four fixtures, the additional cost of approximately $1 per ballast far offsets the cost of wiring necessary to install three 8-ft. fixtures in a single bay on three separate circuits with increased wiring, conduit and additional switch and circuit controls.

Servicing and Lamp Renewals—Despite the conflicting claims of manufacturers, in my opinion, it is still very inconvenient to have both lamps in the fixture inoperative if one lamp fails when using series-sequence ballasts. Think of the additional time and energy used in removing both lamps, in testing to find which lamp is burned out; or carrying a spare lamp on a ladder and trying to juggle the new lamp and remove the bad one. It requires a certain amount of strategy and additional time. In a few years, in my opinion, this adds up to a great deal more than the additional cost of the lead-lag ballasts.

High-Voltage Ballasts—267 to 480 v

In the latest edition of the National Electrical Code, permission has been granted for the installation of gaseous tube discharge type lighting fixtures, which do not have a switch as an integral part of the fixture and which are installed not less than 8-ft above the floor. These may exceed 150-v to ground but shall not exceed 300-v to ground. This means that ballasts can be installed with voltage ratings from 240 to 480 for circuits on three-phase four-wire 440-v grounded wye systems where voltage to ground does not exceed 300-v. Some of the larger companies manufacture lamp ballasts for fluorescent and slimline types of lighting for 440 to 480-v. These ballasts have the same losses and characteristics as do those for 220-260-v circuits but the mere fact that they are designed for 440-480-v does not imply that such ballasts can be installed on a 440-480-v delta power bank where the voltage exceeds 300-v to ground. Such ballasts may be installed across the two phases of a three-phase four-wire grounded wye 440-v power bank. Where control devices are installed for the control of 440-480-v, three-phase, four-wire grounded systems, the switches or other control devices for such circuits shall simultaneously disconnect all the ungrounded conductors of the circuit.

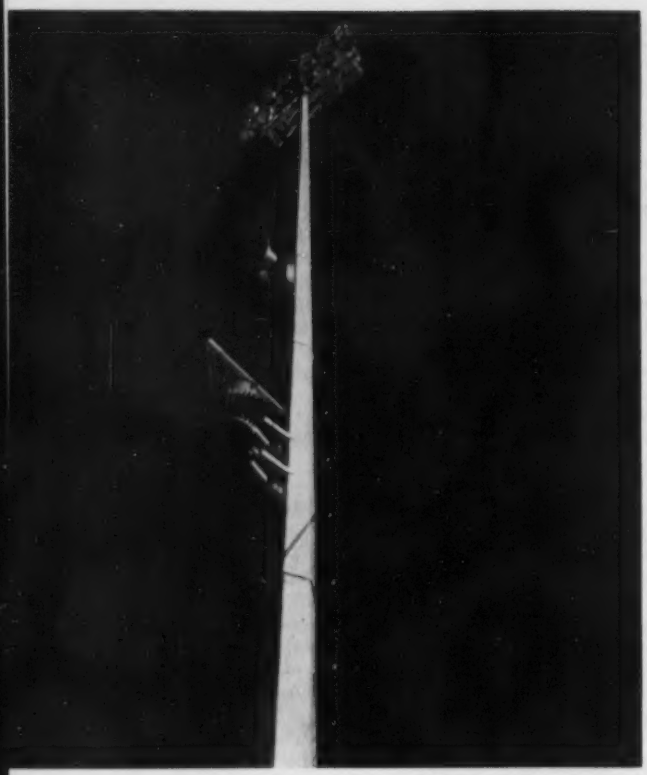
Substitutions—Specifications

It is one thing for an engineer to design an installation, taking into consideration many of the factors herein discussed. He can specify a type of fixture that upon investigation has the proper type of rigidity and construction, ballast raceway provisions and is suitable for mounting for the specific application. He can also specify the addition of radio interference and feed-back filters. Then some salesman, through the electrical contractor, submits a fixture which in his opinion is equal to the fixture specified even though all of the specific conditions are not complied with.

In many cases where lead-lag ballasts are specified, the fixture manufacturer will take a fixture that has been submitted to the Underwriters' Laboratories for approval with series-sequence ballasts and substitute lead-lag ballasts in it. This results in some cases in overcrowding of the ballast raceway provision. There may be insufficient means for conduction of ballast heat away from the ballast. There are other factors which destroy the purpose of the specified fixture installation.

Without thinking the salesman forgets to check or simply believes that the ballasts installed in this fixture will provide for the radio and feed-back filtering. But upon installation it is found that such conditions are not as stated. This results in an unsatisfactory installation for both the engineer and the owner. One of the major problems for an engineer is to see that in his installation he can get materials similar and truly equal to those specified. He has good reasons for having selected them.

These are, in my opinion, some of the trials and tribulations of the electrical industry and it is hoped, through the dissemination of the proper information relative to these conditions, that in some way we may design and produce superior types of lighting installations.



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2

Light Variety-Each an Idea

1

The 100-ft steel pole with 24 1,500-w floodlight units shown above is one of six at Analy High School, Sebastapol, Calif., (see front cover picture too). This pole also mounts a loud speaker and 2,400/4,160 to 120-v transformer, 30 ft above ground. The installation delivers 40 f-c uniformly for football over the field. George Brokau, electrical engineer, with Jim Barnes, PG and E

2

The Christmas outdoor lighting on the home of H. E. Greer in Denver was a winner in the RMEL annual Christmas lighting contest and suggests it is time to organize such contests again

3

Emphasizing contrasts rather than uniform levels makes the lighted wall and dark ceiling at Crossley's Flower Shop in Park Labrea area, Los Angeles, especially effective as a display idea. It gives an apparently luminous atmosphere without the Sunbeam lighting fixtures themselves being too conspicuous. Primary source of light for the perforated metal, white enameled wall comes from a row of special Sunbeam fixtures inclined 30° and obscured from normal viewing angles, 14 ft from the floor

4

Well-lighted shelves at the ZCMI Wholesale Center, Salt Lake City, receive well-distributed illumination from porcelain enameled units designed for vertical distribution on shelves, aisles

4

3

5

5

No portable lamps are necessary in San Diego Gas & Electric Co. automotive repair shop. The area is lighted with 3-lamp, 8-ft, RLM Smoot-Holman fluorescent fixtures using cool white T-12 slimline lamps mounted on the bottom of trusses 19 ft from the floor, on 14-ft centers. Illumination measures from 45 to 52 f-c after nine months' service. The pits, 25 ft long, 3½ ft wide, are lighted with Westinghouse 3-lamp, 4-ft, vaportight fluorescent units, spaced staggered to have three on one side, two the other. Readings under a car average 35 f-c; shadows are nonexistent. White paint is kept clean by staff with great pride

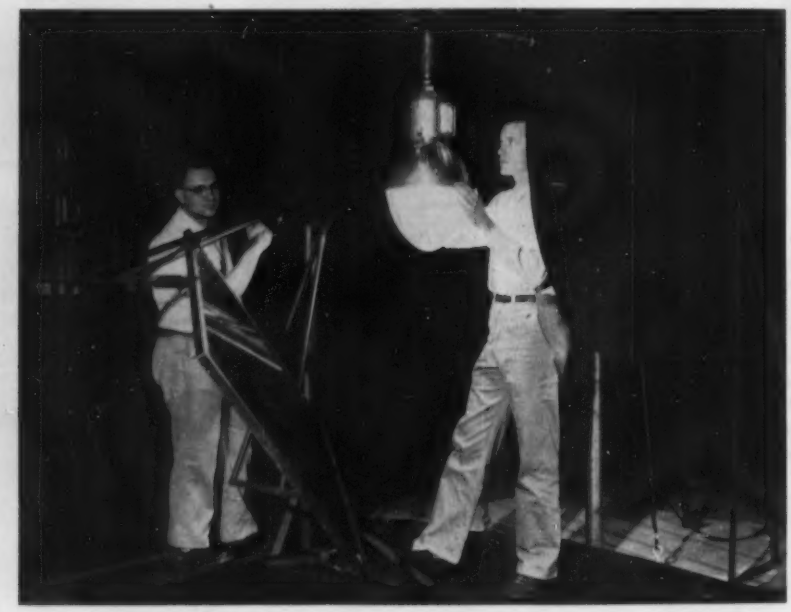
6

6

Largest luminous ceiling in the country was just completed at Douglas Aircraft Co. new engineering building at El Segundo, Calif. There are 110,000 sq ft of Wakefield acrylic corrugated plastic ceiling with the channel system and 8-ft slimline lamps above it. This job incorporates not only lighting but sound control baffles, air conditioning inserts, sprinkler heads in the baffles, 120-v convenience outlets in Wiremold snap-in strip along the bottom of alternate baffles, telephone cables clipped to the top of other baffles, both for intercom and outside lines. And the diffusing plastic makes an attractive ceiling as well as conceals a multitude of pipes, ducts, conduit, etc., in the white painted space above the ceiling. Contractors installing were Hoffman & Jacobs; engineers E. H. Heinemann, Douglas; Kistner, Wright & Wright, AIA, Los Angeles

Associated Press Newsphotos

Twenty types of commercially available street lighting units are installed along this 400-ft four-lane simulated roadway to check the distribution and brightness pattern



And inside an adjacent building this special photometer mounts street lighting units and obtains readings as the unit is rotated on a shaft for distribution chart measurements at

U C Street Light Field Lab

Lighting of roadways by any of 20 types of commercial luminaires on poles of 50-ft spacing and at three different mounting heights is enabling the University of California, Berkeley, at its engineering field station in Richmond to make studies of pavement reflectances, illumination patterns, and visibility of persons or vehicles. This outdoor laboratory setup, simulating actual street and roadway conditions, is jointly sponsored by the Illuminating Engineering Society research fund, project No. 37, the Institute of Transportation and Traffic Engineering at the University, and is contributed to in the furnishing of poles and equipment by several manufacturers and the Pacific Gas and Electric Co.

The only similar setup in the West is a section of street in Portland on which the Portland General Electric Co. has installed a practical street lighting test and demonstration laboratory.

Purpose of the U of C project, however, is noncommercial and aimed at accumulating data relating to the factors that influence the night visibility of roadway obstacles.

The initial installation is a 400x55-ft roadway equivalent to a four-lane road. Additional space is available for a 1,000-ft two-lane extension in one direction and 1,500-ft two-lane extension at the opposite end. These will be used to simulate rural roadways of different types. Paving materials of various kinds will also be checked.

Prof. D. M. Finch, who is also research engineer for the Institute of Transportation and Traffic Engineering and has charge of the project, found it also necessary to make intensity distribution measurements on the various luminaires. In a laboratory building adjacent, a street lighting potentiometer was constructed to evaluate any of the present luminaires except large fluorescent units.

Types of luminaires mounted include radialwave incandescent, several types of incandescent luminaires of various wattages, sodium and mercury luminaires. Facilities are provided for practically individual switching of every unit mounted. A weathertight panel board adjacent to the observation point at one end of the roadway gives this complete control.

Visibility Meter Developed

Work is also being done to perfect the Finch-Simmons visibility meter, upon which Prof. Finch presented papers at the IES national conference in September 1953. In addition to development of techniques to evaluate roadway visibility, tests are to be made of the effect of uniform vs nonuniform brightness patterns and to include glare sources in the study.

Companies which contributed equipment included Baxter Co., poles; Hubbard Co., pole hardware, fittings and wire; G-E Supply Co. and Graybar Co., electrical fittings; G-E Lamp Division, incandescent and mercury lamps; G-E Apparatus Division, fluorescent street light; Westinghouse Electric Corp. and Line Material Co., samples of complete line of street lighting luminaires.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Law and reverse order

A proposed Utah state electrical law was read to the Utah Chapter, International Association of Electrical Inspectors, Aug. 21, when it met in Richfield. The legislation, it is intended, will be presented to the next session of the legislature. It would set up for statewide electrical inspection . . . At the same meeting Paul Ashworth, president of Teluride Power Co., after analyzing the tribulations of the adequate wiring promotion, urged a reverse plan: Instead of the utility footing the bill and doing all the promoting, put the major responsibility on those who profit most, and immediately—contractors, dealers, builders, manufacturers and distributors.

Loss to industry

Teo L. Rosenberg, one of those rare people who were willing to give so much of his time, energies, money, even at the cost of his business, to bettering the electrical contracting industry, died suddenly while on a vacation trip, Aug. 28. Not in good health for some time, he nevertheless devoted much energy to PCEA and NECA activities. He had been regional vice-president for National Electrical Contractors Assn. and a director also of National Industrial Service Assn. and PCEA.

Inadequate for wiring

Wiring finance plan long awaited from PG and E in northern California turns out to be merely an announcement of four available bank and loan company plans that are to be available. Although PG and E will publicize them widely, hold meetings over them, mostly they are only an extension of the appliance financing to cover necessary wiring installation, not for home rewiring. There is no "package" around which contractors can simplify troublesome financing detail with an attractive sales appeal.

Watch these

Two big issues will face the delegates to the National Electrical Contractors Assn. convention in New Orleans, Oct. 26-30. These will be changes in dues and in the change in control of the association from membership vote to vest it in the board of governors, both as to election of top officers and changes in bylaws, Westerners, suspicious of past eastern control, are weighing both proposed changes warily. The dues change would increase the yearly minimum about $30 for small shop members in order to reduce maximum payers' dues. The officers cite the bare service cost per member of $160 in overhead as the reason to raise the bottom bracket; fear of losing the big dues payers if the present scale continues. Copies of the proposed constitutional changes are to be sent members early in September.

Volunteer help

Getting labor cost data voluntarily from contractors has been hard, yet earnest E. R. Cornish, NECA research director, is anxious to revise the estimating system and course, based on NECA manual of labor units, of accurate, up-to-date data. A trained estimator is to be hired by NECA to make personal calls on contractors willing to open up their labor cost data but who haven't time to write it up and send it in.

Change possible

There's hope that some of the things Westerners complained about so strongly about the Council on Industrial Relations may be changed for the better. At a recent NECA administrative committee session in Kansas City these were discussed at length and Ed Buttner, District 6 vice-president, expressed the Westerners' criticism of the handling of recent cases. While a western and an eastern council may not be feasible, possibly a larger panel may be set up, more time required to study the briefs and cases presented and, instead of compromise decisions, the council act in a more judicial capacity.

Line trouble

A line constructors' committee instead of a chapter or a council was decided upon by the California-Nevada Conference of NECA Chapters at its meeting in Oakland Aug. 14. Each chapter would have its own committee and would be a member of the conference's committee. The latter would negotiate supplemental and area agreements on line work. In southern California something like that has been operating. The main problem is that there is little line work open to contractors now so linemen are being taken back into inside locals.

Home stimulant

FHA Commissioner Norman Mason told the Utah Housing Council provisions of the revised housing act which reduces down payments, extends terms to 30 years making smaller monthly payments, insures mortgages up to 95%, raises the limit to $20,000, and other features. More liberal terms for existing homes to encourage remodeling, and the open-end mortgage is also for future repairs, improvements and additions. The act was signed the day following his talk, Aug. 12.

Save the old homes

Cyrus B. Sweet, Fresno, manager of Valley Lumber Co., was named by Mason as his director of FHA's home modernization and repair program. Loans up to $2,500 will be authorized. New standards for housing are also being prepared with the help of the building industry. Perhaps the 100-amp, three No. 2 wire main service will be incorporated, as it is now a voluntary standard of the NAHB. Two Westerners were appointed by Mason to advise with Sweet on loans for modernization—D. Z. Albright, vice-president, Security-First National Bank, Los Angeles, and W. L. Johnson, vice-president, Construction Finance Co., Boise. One of the first actions, Aug. 26, was reduction in premium charges on such loans.

Blockaded

Federal Construction Contract bill, which NECA and other subcontractors associations fought for two sessions of Congress, never reached the floor for debate because of Defense Department opposition. It was designed to stop cost-plus-fixed fee and bid shopping evils.

Back to life

Electric heating is in the news in many places . . . Washington Water Power Co. has a reverse cycle research program going in several employees' homes to gather operating data, some using heat from ground, some the air . . . Utah Power & Light has just issued a "Guide to the use of Electricity for House Heating," listing various methods, stressing proper house insulation and giving estimated costs by house size . . . Puget Sound Power & Light has applied to the state commission for an electric heating rate in its western Washington area.

Industrial heating

Metal sheath electric heater course is now offered by the Industrial Electrification Council, 420 Lexington Ave., New York, available Sept. 1. It consists of six two-hour demonstration-type lectures, has a teaching kit with leader's guides, textbooks, slides, films, etc.

Available aids

Lighting has this to announce: RLM Standards Institute's new printing of its specifications for industrial lighting units is off the press and available. Write the Institute, 326 W. Madison St., Chicago . . . IES has published a packet of its residence lighting data sheets called "15 Home Lighting Ideas" that sells for $1. Write 1860 Broadway, New York . . . Edison Electric Institute is running a national farm lighting promotion in September, October and November. "Be Modern—Light Up the Farm" is its theme. A 14-page booklet, "Light for Seeing on the Farm" and a slide kit are selling tools in it.

Booklet helps

Lighting manufacturers too, have sales promotion material. Lightolier has a new catalog "Wonderful Things are Happening in Lighting," containing new ideas and use of fixtures and lamps . . . Sylvania has two new booklets—"Better Lighting for Your Farm" and a new "Fluorescent Guide" written in nontechnical language.

Samples

Seattle may start installing mercury-vapor lighting on 19 residential streets. City Engineer W. E. Parker has proposed this to the council, at an estimated cost of $17,500. Lights of lower lumen output than used on arterials would be used. The samples would be to demonstrate the type recommended under a contemplated bond issue, estimated to run to over $4,000,000, which may be put on the November ballot.

Dimmer control

Dimming of fluorescent lamps can now be done in a much simplified way and at lower cost, thanks to a new method of regulating brightness just announced by General Electric Co. The dimmer will control the light output of up to twenty 40-w rapid start fluorescent lamps at a time. A previous complex electronic control device introduced in 1952 for control of a larger number of lamps left much of a market untouched. A much deeper market is opened with this method in stores, displays, or even homes and offices if dimming is desired. Special lighting effect with colored fluorescent lamps open many possibilities.

Special

A custom department to make lighting fixtures to special designs of architects has been opened by the Miller Co. of Meriden, Conn.

Appropriate tie

National Electrical Week is being tied in with the Light's Diamond Jubilee industry-wide promotions throughout the West. Final plans to make the most of this observance are to be discussed and developed at the International Association of Electrical Inspectors' annual meeting of the Southwestern Section at Elko, Sept. 13-15, and the Northwestern Section at Portland, Sept. 23-25. Probably the most effective piece of literature will be the "Home Electrical Inspection Check Chart," used so effectively in Michigan last year. Thousands of copies of this will be printed and distributed by the industry in the West.

Good choice

Norman Wicks, who toured the West for the National Adequate Wiring Bureau a few years back and then handled NEMA'S relations with the war agencies, has just been appointed manager of the business development department of National Electrical Manufacturers Assn. to succeed O. C. Small, also well known to electrical leagues and AW groups in the West. Small becomes a consultant to the department.

Had you heard?

Among people there is this news: F. L. "Hock" Hockensmith has closed the F. L. Hockensmith Sales Co. in Los Angeles and is now associated with Allied Industries, R. W. Brown announces . . . Day-Brite has appointed the Gleason brothers, Don and Fred, to represent it in the State of Washington with headquarters in Seattle. They have been partners in the lighting field for five years. Their territory will also include Alaska. In Montana, with headquarters in Butte, Paul G. Krick, formerly with Westinghouse and recently of Electric Supply Co., Albuquerque, will represent Day-Brite . . . A. B. Leach has been appointed Copperweld Steel Co. representative in northern California, succeeding Harry J. Billica, retired. His office is in the Monadnock Bldg. In Seattle, L. E. McGuire, district manager, moved from Seattle to 10219 N. E. 30th Place, Bellview . . . S. E. Jarvis, now Vancouver Island manager for Century Sales Ltd., was honored at the Victoria Electrical Club's annual dinner for his 50 years in the industry. In 1904 he joined Cope & Frey Co., contractors; 1910, he organized his own company, Jarvis Electric; and more recently was with B. C. Electric and became Vancouver Island representative for Electrical Service League of B. C. . . . Victor Gruen, well-known architect and store designer, moved from 8460 Santa Monica Blvd., Los Angeles, to 135 S. Doheny Drive, Beverly Hills . . . George Linehard is now manager of Safety Live Line Tool Co. of Oakland. The company has moved to 973 86th Ave. . . . Bay Counties Electric Supply Co. is a new distributor of apparatus and supply lines at 10000 Edes St., Oakland, just formed by Frank McNamara . . . Bill Goulart, formerly proprietor of Pioneer Electric, Richmond, started a new business, Goulart Electric Co. at 3119 Market St., Oakland . . . O. Clarence Armstrong, Argo Electric Supply Co., Huntington Park, and Jack D. Smith, Coast Wholesale Electric, Burbank, were two Westerners who completed the NAED executive training course at Harvard Graduate School of Business.

Moves and such

Some manufacturer changes: Westinghouse Lamp Division is moving its warehouse facilities from 60 Federal St., San Francisco, to a much larger space in the Westinghouse property at 5815 Peladeau St., Emeryville, according to George B. Mackey, Pacific Coast regional manager . . . Trade-Wind Motorfans Inc. moved to a new building at 7755 Paramount Blvd., Rivera, Calif., from downtown Los Angeles . . . The Roy C. Stove & Co., makers of ultraviolet equipment, has a new name and location. It is now called Air-Tron Inc. and is at 3536 W. 16th St., Indianapolis, Ind. . . . Johns-Manville Sales Corp. announces appointment of Electrical Specialty Co., 1101 Stout St., Denver, as distributor for its high temperature Quinterra and Quinorgo electrical insulation . . . Afco Lite Corp. of Chicago announces appointment of Valley Specialties Co., Van Nuys, as representative in California, Arizona and Nevada, to El Paso.

Rugged stuff

Larsen-Hogue Electric Co., Los Angeles, is now featuring a new insulating compound for electric motors made by American Insulating Materials Co. under a new process, with a trade name of "Aim." It has a special chemical resistance and high electrical properties. The research pilot shop was Johnson Electric Co. of Glendale, which is the address of the manufacturer, 512 W. Windsor Road.

Foreign ideas

An international lighting and design competition is being sponsored by B. Blitzer, Lightrend Co., Los Angeles, importer of lighting fixtures. A number of entries of very interesting modern design have been made from Germany and Italy. Awards are to made Sept. 21 in Los Angeles.

Revision

Public hearings on the proposed revisions of California Electric Safety Orders will be held at the state buildings in Los Angeles Sept. 22 and in San Francisco Sept. 27.

Code on conditioners

Unit air conditioners have brought about an interim amendment, No. 101, of the National Electrical Code, effective Jan. 1, 1955. It calls for grounding of all proposed noncurrent-carrying metal parts likely to become energized and has a requirement that total load of motor-operated equipment shall not exceed 80% of the rating of a branch circuit supplying no lighting or other appliances, or not exceed 50% if lighting and other appliances are also supplied.

Buy their own

All types of meter sockets, single and three-phase, will no longer be issued to customers by B. C. Electric Co., although the utility will continue to supply metering transformers. Meter sockets will be installed by contractors and paid for by customers.

Delete

High-voltage switchboard section of the Pacific Utilitites Electric Service Requirements Coordinating Committee has some new revised plates, just issued by the committee. Use of 20x36-in. and 30x36-in. combination transformer and meter socket boxes has been discontinued and deleted.

New styles

Smithcraft announces three new lighting developments. First is called the Selsliter, a new open-type fluorescent lighting system for ceiling mounting on chain store and supermarket ceilings; the Sheraton, the shallow louvered unit with translucent plastic sides for use on low ceilings; and the Chalkboarder, smartly-styled unit for illuminating schoolroom chalkboards.

NECA doings

Among the NECA chapters, this news: Don Larson, manager, Rocky Mountain Chapter, addressed the Rocky Mountain Electrical League in a joint electrical industry luncheon on "How Can the Electrical Contractor Best Serve the Electrical Industry." Another industry meeting is scheduled Sept. 20 and the annual chapter meeting Sept. 13 . . . San Diego Chapter agreed to a 10c health and welfare increase, thus still more upsetting the unbalanced California wage and welfare situation . . . Fresno Chapter still had not settled. An independent association at Bakersfield may go to the council on health and welfare . . . Contractors in the Monterey Bay area voted to form the Monterey Bay Chapter and elected Jim Murtz, J. M. Electric Co., as temporary chairman and Orville Jones, Wilder & Jones, Carmel, temporary secretary. Monterey and Salinnas are affiliated and Watsonville and Santa Cruz have been invited. Richard McBeth, present manager of an association of mechanical contractors, having a depository, will manage the chapter . . . Northern California Chapter begins its job management course in October at Oakland Junior College with Henry M. Tilson as instructor. It will have 36 meetings covering five study units.

Heat control

A new low-cost thermostat for electric heating, including radiant panels, wall heaters and other types, has been announced by Robertshaw-Fulton Controls Co. The unit has a high rating for a wall-type thermostat—20 amp (noninductive load) at 125- or 250-v a c. It is listed by UL.

Silent

NuTone has a ceiling ventilating fan for the bathroom of a blower type with a practically noiseless motor.

Coming

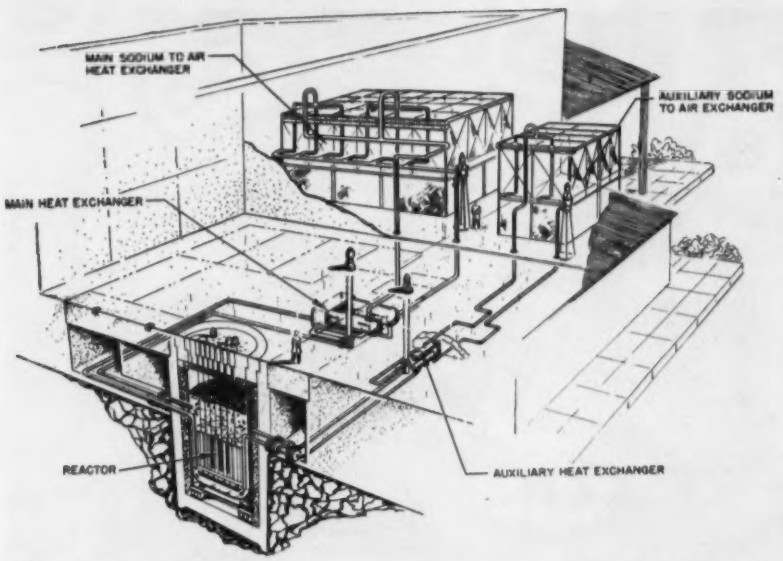
Howard Electric of Chicago is readying a new electrical underfloor system to be introduced this fall.

Off the press

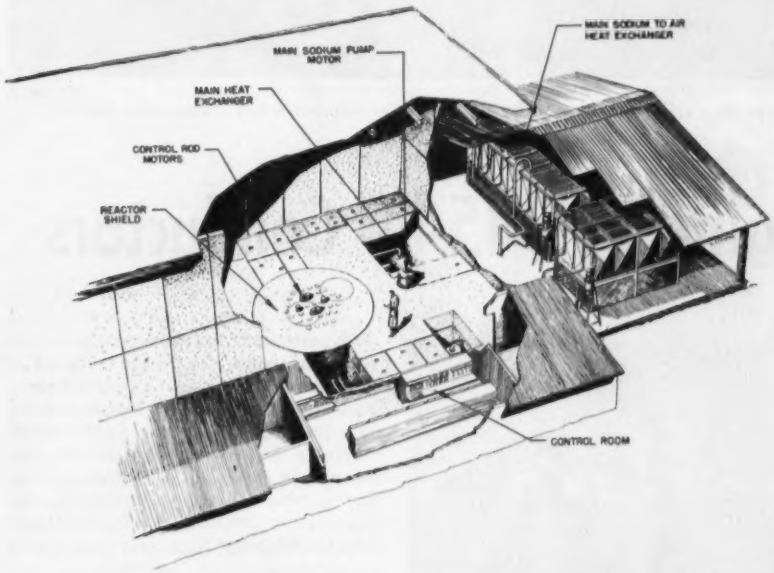
Abbott's National Electrical Code Handbook in the eighth edition, covering changes in the 1953 Code, is now off the press and available from McGraw-Hill Book Co.

Sticks it through

Sterling Varnish Co. has a new type of adhesive for bonding glass mica, varnished cambric and other varnish-saturated tapes used for insulating coils. The adhesive contains a Bakelite venyl resin resistant to varnish solvents. It also resists petroleum and coal-tar solvents and hence will not loosen when dipped in varnish. When baked, the bond is hardened and strengthened. It is supplied in collapsible tubes.



Artist's conception of experimental power reactor to be built by North American Aviation near Los Angeles. Reactor will be of the sodium graphite type, one of the most promising types for power generation. Turbine-generator part of plant will not be built



In the sodium graphite reactor, heat will be produced by the reactor (front), and absorbed by liquid sodium. The hot sodium will be pumped out of the reactor to main heat exchanger (center) where another sodium system absorbs the heat to carry it to exhaust fans (upper right). If electric power were to be generated, heat would produce steam

West Gets Power Reactor

As part of the Atomic Energy Commission's program to develop competitive nuclear power, a sodium-graphite reactor generating 20,000 kw of heat energy is to be built by North American Aviation in the Santa Susana Mountains just north of the greater Los Angeles area. North American believes that the sodium-graphite reactor is a promising type for economical power production.

Work with the SRE (sodium reactor experiment) is expected to provide some of the answers. Characteristics of sodium that make it particularly suitable as a reactor coolant are the metal's low neutron absorption qualities, good heat transfer properties, low melting point and high boiling point. Since this type reactor will operate at higher temperatures than do some other types, higher over-all plant efficiency is expected.

The reactor, including core and cooling sodium, will be encased in a steel tank installed underground—with 5 ft of dense concrete between the reactor and ground level. Graphite, used to moderate or slow down the neutrons that cause the U235 to fission, will surround the fuel. Design calls for 10,000 gal of sodium to flow through the core and absorb the heat of the fission process. Boron-steel control rods moved by motors in and out of the core will regulate the rate of fission.

The heated sodium will be pumped to a primary heat exchanger. Being radioactive, the metal will give up its heat through a primary exchanger to another sodium circulation system. This system will take the heat via uncontaminated sodium to a second exchanger where the heat can be provided without the presence of radioactivity.

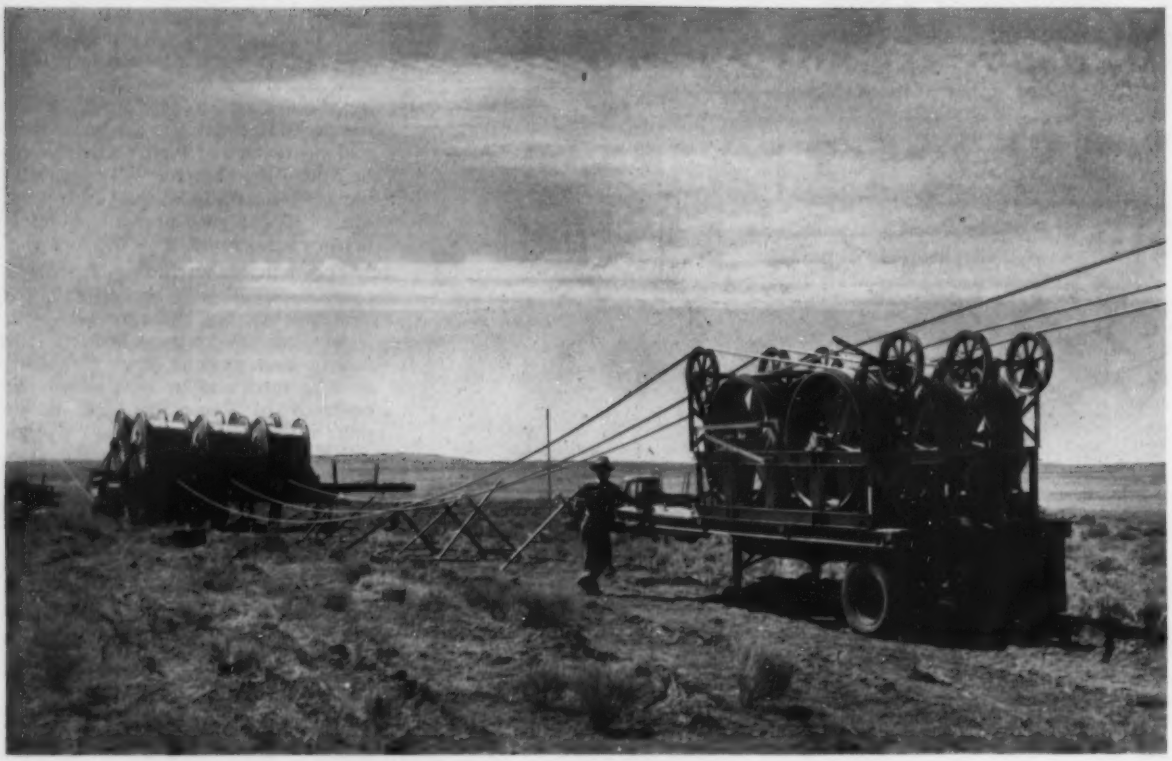
Development of fuel elements and various combinations of fissionable materials for the reactor core will be an important part of the program. Uranium slightly enriched in U235 is to be used, but studies can be made with Thorium and U233 in the core.

North American is assuming $2,500,000 of the estimated $10,000,000 to be spent in construction, research and development. Completion is expected in about two years.

Law Laid Down

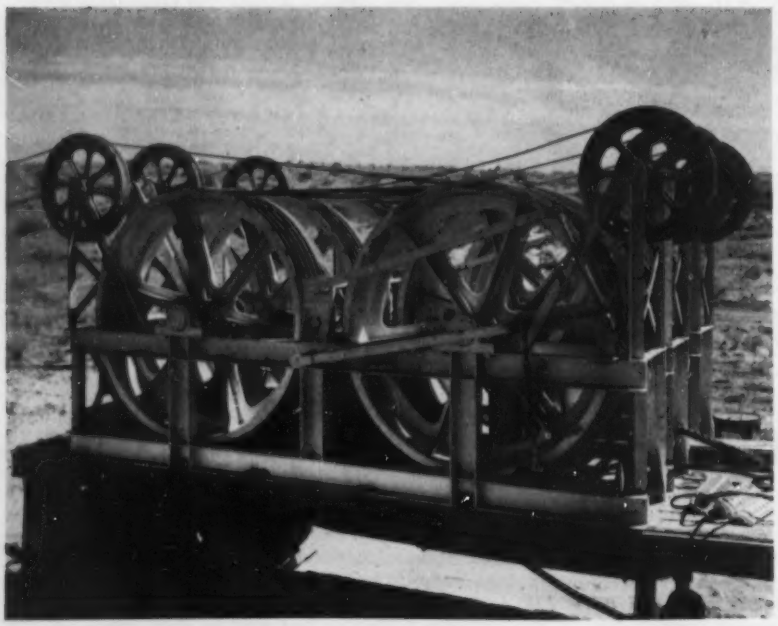
High starting demand of small air conditioning and room cooler motors, low running demand and poor power factor, are problems concerning members of the Pacific Coast Electrical Assn.

The board of directors of that association, after reviewing a report of a special committee, has sent a resolution to the Air Conditioning and Refrigeration Institute, Edison Electric Institute and the National Electrical Manufacturers Assn. Their cooperation is requested in seeing that motors supplied with air conditioning equipment have voltage rating and starting current and power factor characteristics that will be unobjectionable to utilities.



Corona loss and radio interference will be kept to a minimum on new Bonneville Power Administration transmission line by . . .

Tension Stringing of 345-kv Conductors

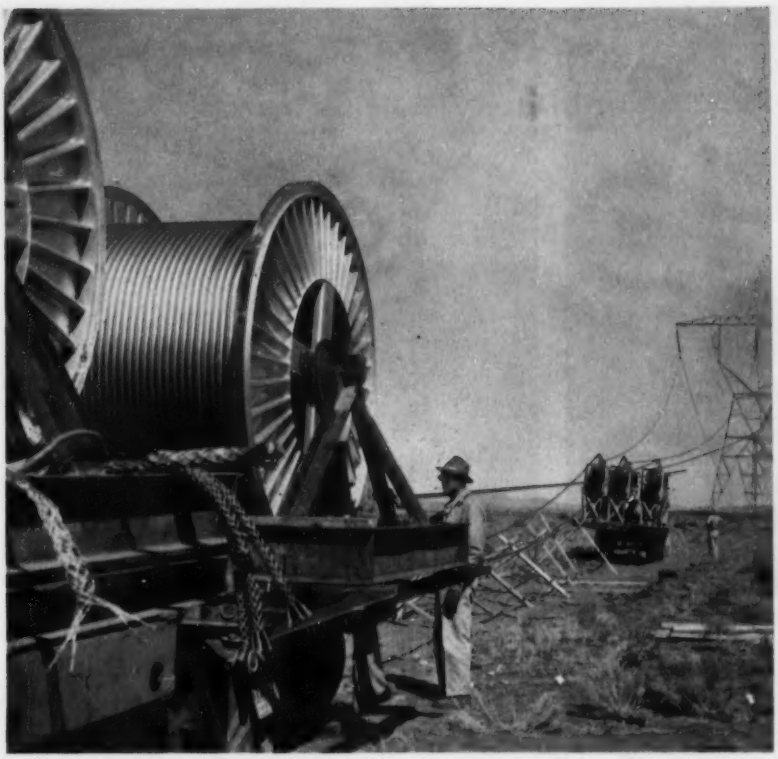


Steel cable has been threaded through tension machine preparatory to starting the pull

Aluminum transmission conductors for 345-kv operation must be handled with meticulous care to prevent nicks and abrasion if corona loss and radio interference are to be kept within tolerable limits. For this reason, the contractor elected to use tension stringing on the 90-mile contract for the Bonneville Power Administration's 345-kv McNary-Ross line now under construction.

This is one of the few cases so far where transmission conductors have been strung under tension so that they do not touch the ground at any time. The accompanying staff photographs show equipment and methods.

The job here described is of further interest because of the unusual size of the conductor—1.602 in. in diameter, ACSR—made by the Aluminum Co. of America at its Vancouver, Wash., wire mill. The steel core is 19x.0874, diameter .4370 in.; the aluminum 84x .1456, over-all diameter 1.602 in. Wire is shipped to the job in lengths of about 4,400 ft on steel reels. Minimum permissible bending radius for the conductor is 21 in. Reel drums are 42 in.



Aluminum wires in leaving reels pass over wooden rollers, thence to the tension machine

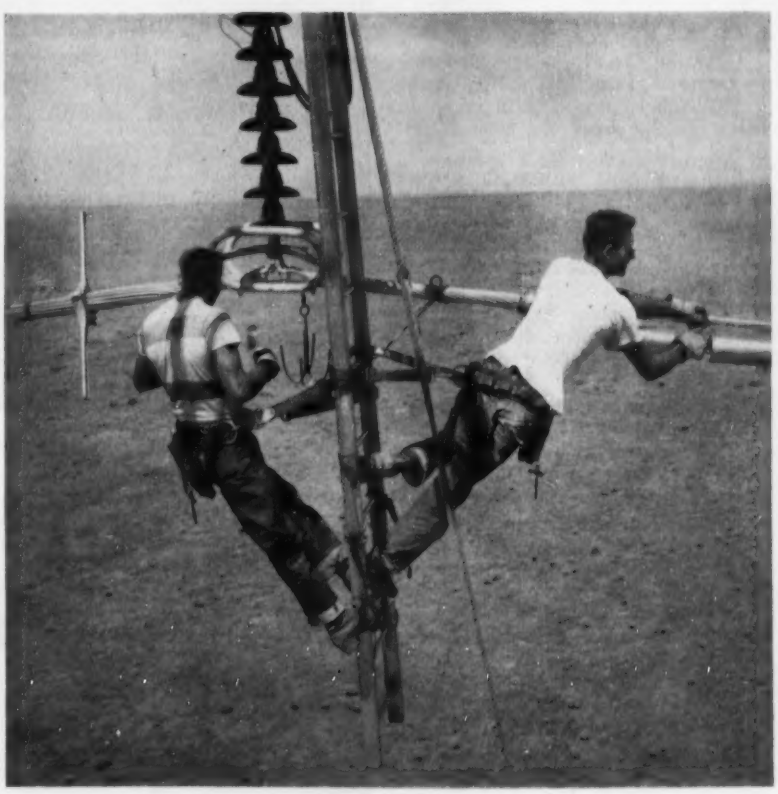
Stringing operations are under radio control

The contractor, Bay Construction Co. and Don L. Cooney, is using a tension machine made by the Young Iron Works of Seattle. As shown, this machine has two large drums for each conductor. Over each of these there are five wraps of the conductor in spiral grooves. By means of large brake drums a tension of 6,000 lb is held on the wires. Behind the tension machine, 150 ft or so, are the wire reels. As may be seen, three reels are mounted on trailers set crosswise of the line. Five such sets of three reels each are used in each pull, a line length of approximately 22,000 ft, or more than four miles. Thus nearly 36,000 ft of steel stringing line is used. Stringing sheaves are of aluminum, 24 in. in diameter on roller bearings.

The pull is made by tractor and all three wires are pulled at the same time. With average span lengths of 1,150 ft, the conductors seldom sag to the ground. If they do, boards are used to prevent contact with the earth.

Stringing operations are under radio control at all times. In addition to several mobile transmitter receivers, the portable fixed station shown is used. This is located at the reel end of the pull and saves tying up a piece of automotive equipment.

With the extreme care being used the energized conductors will have their original smooth polished surface.



Clipping-in the 1.602-in. ACSR conductors on BPA line that is soon to operate at 345 kv

Splicing the 1.602-in. ACSR conductor. Sharp corners made by the hexagonal die are rounded with file to prevent radio interference

Special precautions are also taken with the splices. On the 36¼-in. splicing sleeves a hydraulic press with hexagonal die is used. The splice is not complete until all the sharp corners have been rounded off with a file.

Line Design

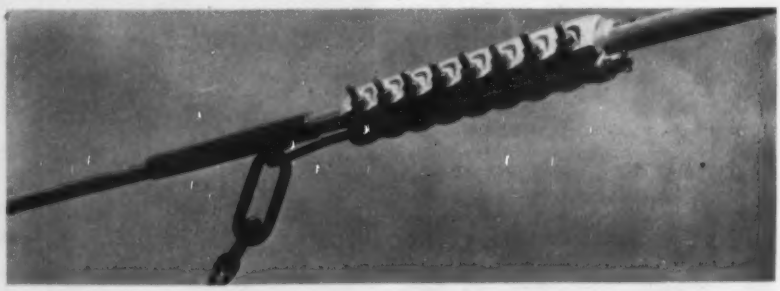
Design of the 345-kv line is of further interest. Towers, as shown, are of the BPA light type not designed to withstand the stress of a broken conductor.

BPA has taken advantage of the rare occurrence of such breaks to save 6,700 lb of steel per tower. Average height of towers is 75 ft and, as stated, span length runs about 1,150 ft. Conductor spacing is 32 ft and sag 35 to 40 ft. On suspension towers nineteen 25,000-lb, 10-in. suspension insulators are used. Dead-ends have triple strings with 21 units in each.

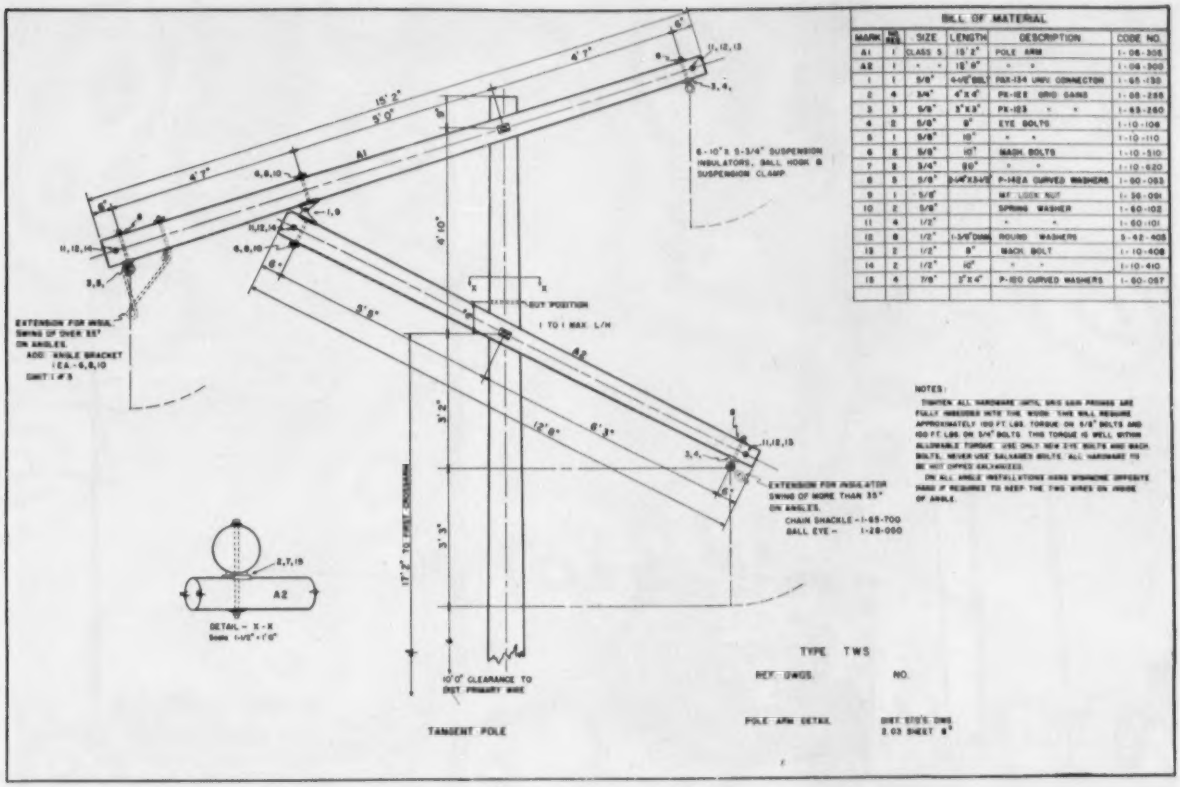
Armor rods are 14 in number, of uniform diameter (.436 in.), 96 in. long. A new practice in installing these rods is to use a wrench with steel instead of aluminum die. This makes spiraling much easier and leaves a smoother surface. Spherical clamps, 5 in. in diameter, are used at the ends of the rods. Grading rings, furnished by Ohio Brass Co., and Stockbridge-type vibration dampers, furnished by Alcoa, complete the assembly.

Since this is the first line to be built by the Bonneville Power Administration for ultimate operation at 345 kv, construction techniques are being perfected so that they may be applied to other lines to be built for operation at 287 kv and 345 kv.

Temporary dead-ends are made to deadman consisting of pole buried crosswise of the line



Come-alongs for big conductor consist of hinged, accurately machined aluminum clamps


BILL OF MATERIAL
MARK NO REQ SIZE LENGTH DESCRIPTION CODE NO.
A1 1 CLASS 5 15' 2" POLE ARM 1-06-305
A2 1 " " 12' 6" " " 1-06-300
1 1 5/8" 6-0" BOLT PX-134 UNIV. CONNECTOR 1-05-130
2 4 3/4" 4"X 6" PX-102 GRID GAINS 1-08-255
3 3 5/8" 3"X 3" PX-103 " " 1-85-260
4 2 5/8" 9" EYE BOLTS 1-10-106
5 1 5/8" 10" " " 1-10-110
6 2 5/8" 10" MACH. BOLTS 1-10-510
7 2 3/4" 20" " " 1-10-520
8 5 5/8" 3-1/4"X3-1/2" P-142A CURVED WASHERS 1-90-053
9 1 5/8" NUT LOCK NUT 1-30-091
10 2 5/8" SPRING WASHER 1-60-102
11 4 1/2" " " 1-60-101
12 8 1/2" 1-3/8" DIAM. ROUND WASHERS 3-42-405
13 2 1/2" 8" MACH. BOLT 1-10-408
14 2 1/2" 10" " " 1-10-410
15 4 7/8" 3"X 4" P-100 CURVED WASHERS 1-90-057
6-10" & 8-3/4" SUSPENSION INSULATORS, BALL HOOK & SUSPENSION CLAMP
EXTENSION FOR INSUL. SWING OF OVER 35° ON ANGLES. ADD ANGLE BRACKET 1 EA - 6,8,10 UNIT 1 #3
GUY POSITION
1 TO 1 MAX. L/H
EXTENSION FOR INSULATOR SWING OF MORE THAN 35° ON ANGLES. CHAIN SHACKLE - 1-65-700 BALL EYE - 1-28-050
DETAIL - X - X
10'0" CLEARANCE TO DIST. PRIMARY WIRE
TYPE TWS
REF. DWGS. NO.
POLE ARM DETAIL
TANGENT POLE

Detalis and bill of material for new type of wishbone crossarm construction for 115-kv lines using round arms and special hardware

Pole-Arms Cut Line Costs $400 per Mile

Harry F. Pearson

Standards Engineer
Portland General Electric Co.

Fortunately, developments in the industry coincided this year to permit a redesign of 115-kv transmission to support heavier circuits, provide balanced vertical loading and save approximately 10% on the cost of pole structures. New hardware items incorporated in PGE's 115-kv wood pole transmission design are the malleable iron grid gain plates and universal angle connectors, made by the Malleable Iron Fittings Co., used for joining round wood member crossarms. Recent increase in the use of small poles for barn and shed construction, as well as expansion of rural telephone lines, has made available ample supplies of suitable pole-arm material at attractive prices.

Illustrated is a reduction of the record drawing of the tangent wishbone standard structure that is also adaptable to small line angles. This structure may be used to support ACSR conductors to 795 MCM and to 450-ft effective spans, designed for medium loading and grade B construction. The longest actual span on a line to be built supported on pole-arm wishbones is 420 ft. The pole-arm wishbone is easily doubled for longer spans.

Construction specifications include special attention to secure static-free hardware by using torque wrenches, spring washers and lock nuts. All pole-arm hardware may be attached before delivery to the job in order to facilitate supervision, uniformity and use of power tools. A standard single down guy to the guy position shown on the drawing is also adequate on the line angles allowable when class 2 poles are used.

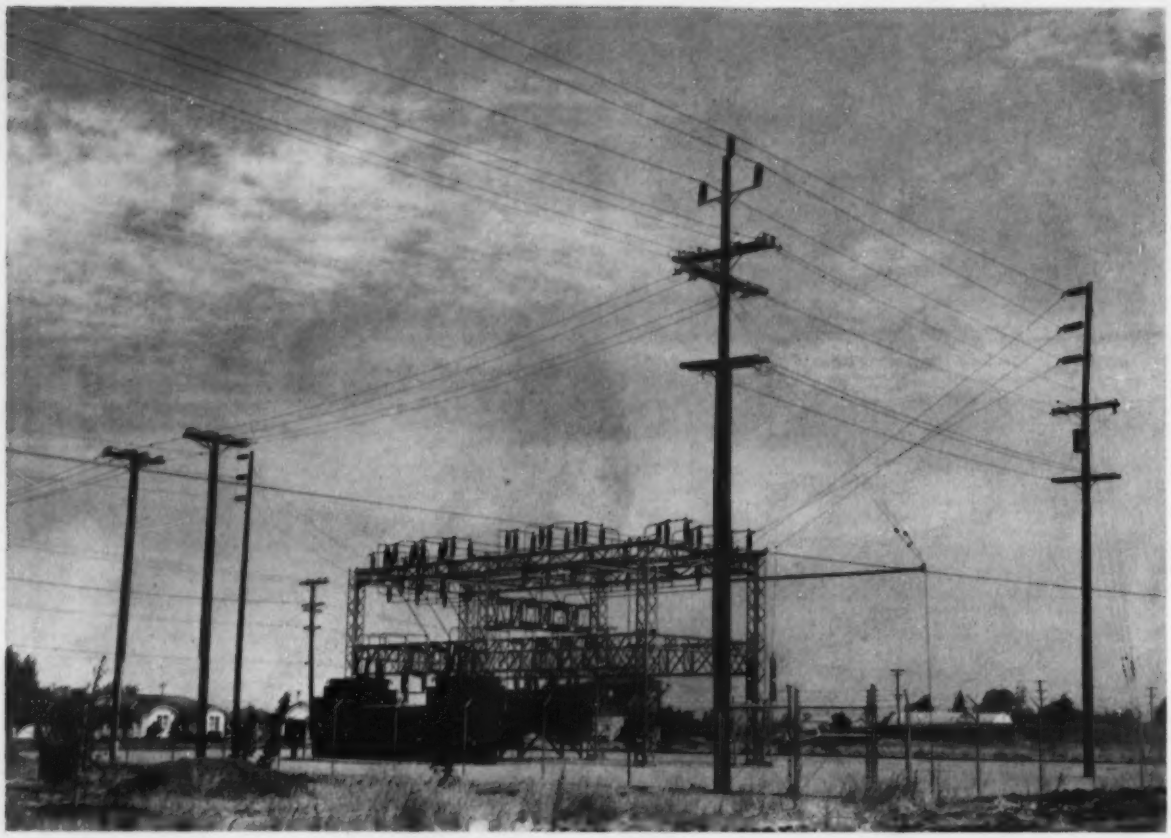
This 115-kv transmission line and most transmission lines on the PGE system will also support distribution circuits, resulting in pole heights averaging about 70 ft. Approximately balanced vertical loading for average spans is accomplished by the extended lever arm of the outboard conductor plus the inherent unbalanced weight of the structure itself.

No gains are cut in the pole. The pole and pole-arms are bored before treating and there is no wood-to-wood contact between members. Experience may indicate that slitbolts are unnecessary. The pole-arms accept treatment to 100% of sapwood resulting in much greater penetration than possible on sawed timber arms. Pole-arms are readily selected for strength and inspected for quality, equal or superior to sawed timber arms as required.

Material costs for the 115-kv wishbone framing, using Pacific Coast Douglas Fir, compare as follows:

	New Pole-arm Type	Present 6x8-in. Timber Type
Arms	$10.80	$19.60
Hardware	12.00	25.50
	$22.80	$45.10

The balance of the structures are the same for either framing. Labor cost comparisons have not been established. For the usual line using 18 tangent poles per mile, the new design would save $400 per mile at $22.30 per pole.



New 60-kv loop is bused through unit substation with switching for sectionalizing. Sub may be expanded to four double-ended units

There Comes a Time for

Rebuilding Distribution Systems

60-kv loop, unit substations and new feeders were solution to Palo Alto's growing pains. The job reduced losses, raised customers' voltage, improved regulation, bettered service

A 60-kv loop with unit substations and new feeders has proved the solution to growing pains suffered by the municipal electric system in Palo Alto, Calif. With a load growth of 14.3% a year during the postwar period the distribution system had become entirely inadequate capacitywise. In this city of 36,000, annual peak is 16,000 kw for the 13,400 customers served. There are 11,300 domestic customers with average annual consumption of 1,960 kwh per customer. Annual load factor is 47% and power factor runs 98%, integrated over a month's time.

With an appreciable saturation of ranges and water heaters and with 50% of new houses being wired for range, water heater and, in many cases, househeating, it became imperative that the entire distribution system be revamped to serve the larger loads of the future.

Old System

Prior to the rebuild, now nearing completion, the entire city was served by eight 4-kv feeders from a single substation. Now, with the loop 60-kv line there are thirteen 4-kv feeders served from four new unit substations. These stations, furnished by Westinghouse, are of the double-ended type with two 2,000-kva transformers, each serving one 4-kv feeder. Future expansion will be made with additional double-ended unit substations side-by-side with the initial installation.

As shown in one of the photographs, the high-tension bus of the substations is part of the 60-kv loop line. Feed from either direction is made possible, of course, by disconnects and OCBs.

Oil circuit breakers on the 4-kv primary feeders are of the reclosing type, set for instantaneous reclosure on the first tripout, reclosure in 15 seconds on second tripout, and 45 seconds on the third. Each feeder is regulated by automatic tap changing under load equip-

ment built into the transformers. Feeders are four-wire, grounded only at the substation and provided with sensitive ground relaying.

New Feeders

New primary feeders are bare aluminum conductor graduating in size from 266,800 cir mil at the substation to 1/0 and then to No. 2. An important philosophy on the primary system is that all three phases are extended well into the load areas, with only short single-phase runs. This permits taking full advantage of the greater economy of serving loads at three phase. The high system power factor of 98% results from extensive use of primary capacitors. Approximate aggregate capacitor rating is 3,000 kva.

Secondary Construction

One of the accompanying photographs shows the type of rear property line construction for new tracts. Secondaries are racked, using all-aluminum conductors. Services are triplex aluminum. Standard wire size of secondary hot legs is 1/0 with 3/64ths polyethylene insulation. Neutral is No. 2 polyethylene covered. Services are No. 4 on all three conductors.

Secondary banking of transformers is extensively used with no protection but the primary transformer fuses. Capacity of secondary banks is usually three 25-kva transformers. Over a long period of years practically no trouble has been experienced with cascading or other trouble from this banking practice. Advantages, of course, are better utilization of conductor material, better voltage regulation and mitigation of the flicker problem.

60-kv Loop

Economic studies showed that for the 10-mile high-tension loop, 60,000 was the most economical voltage with the one-point of delivery from a single 60-kv line of Pacific Gas and Electric Co. Conductor size is 3/0 ACSR on post-type clamp tie Ohio Brass insulators in triangular configuration. Steel crossarms and pinnacle pins were furnished by Hubbard. All hardware is bonded but not grounded.

This revamping of the distribution system, costing approximately $1,000,000, now practically complete, has reduced system losses by about 3% and greatly improved customers' voltage and regulation. Most importantly, it is the fruition of long-range planning that will provide capacity for load growth for many years to come. Ed Heath is chief electrical engineer for the city-owned system.

Typical 60-kv construction showing post-type insulators to minimize radio interference

Racked aluminum secondaries and triplex services are standard for new tract construction

ELECTRICAL WEST

This Was an Alarming Proposal

SOME suggestions which seem feasible and practical on the surface turn out to be just the opposite when examined carefully. Two recent proposals that utility service be used to alert the public in case of an actual or potential air raid fall into that category. One was that all telephones be rung continuously until somebody lifted the receiver. Another was that a variation in frequency in power lines upward or downward be used to operate an alarm on the premises of each electric customer.

The suggestion from the Federal Civil Defense Administration that an air warning device be actuated by varying the standard utility 60-cycle frequency upward by 2½ cycles or by imposing a 720-cycle carrier frequency impulse appears to have merit. But analysis and exploration reveals that it is both impractical and uneconomical. Consider these objectionable aspects:

An alarm would cost $5 at the very minimum and would entail considerable critical material. Would all customers buy them? Who would maintain them if this should prove necessary? Could any particular vulnerable area be isolated in the case of a large interconnected system? An alert for San Francisco or for Seattle would spread over the entire area covered by the Southwest Power Pool in the case of the former and five states served by the Northwest pool in the case of the latter. Who would take care of the equipment damage or operating losses of the many industrial and commercial customers to whom accurate frequency control is a must? If a 2½-cycle boost in frequency was used, who would pay the cost of the additional generating capacity required to raise it that much? Might there not be times when this much additional capacity was unavailable? With a 720-cycle carrier there could be no guarantee of reliability and the cost of installation might prove prohibitive. What about the public relations effect of a false alarm? One California power company still bears the scars from the public beating it took when frequency was reduced slightly during a serious water and power shortage.

Equally serious arguments can be raised against continuous phone ringing.

For the present the best air raid alarm system consists of strategically placed sirens. A large number of them can be bought, installed and maintained for a fraction of what it would cost to depend upon varying frequency on utility systems. Besides the public knows from experience that the sirens work.

Backing Away from Business

LUMINOUS ceilings present one of the big opportunities to the industry for more kilowatt-hour usage and to the contractors for remodeling and installation and then after that maintenance. But like so many of the opportunity devices or services the industry has had open up for it, luminous ceilings bid fair to be lost to some other group than the electrical people unless their tactics change. Why is it that we like to complicate rather than simplify things so?

Motors used to be an item that the electrical contractor was supposed to sell but he lost the new-motor business to the machine makers. Batteries, an electrical item, used to be sold by electrical shops, but now the automotive trades have them. Appliances were once a contractor-dealers' item but they did not seize the selling opportunity and it slipped away to department stores, specialty stores, and now it is slipping still further off, to discount brokers. Lamp globes once were an electrical dealer's business but where are they now—in the dime stores and supermarkets. Freezers were an opportunity that electrical dealers missed but frozen-food and food-plan operators saw the chance to clean up on them and did.

Next, if the electrical industry doesn't watch out, will be residential rewiring. The overloaded circuits in present inadequately wired houses are making the public ripe for picking by somebody with some selling ability who comes up with a simple package plan on easy terms.

After each of the mentioned things had been taken over by enterprising others and

EDITORIAL VIEWS

made a money-maker the affected group in our industry wept and yelled for some kind of law or combination or pressure to stop those others from taking the business away from them. But in many cases they never had the business—they backed away from it. They made it hard to get, expensive and complicated. So the public, wanting the service, found someone else to give it and paid for it willingly.

Luminous ceilings have been made up by electrical manufacturers in easy-to-install packages that any half-alert electrical contractor or wireman can handle—and sell.

How the MDs Achieve Unity

IN searching for professional standing and professional unity engineers frequently refer to the American Medical Association as typical of the kind of an organization that will help achieve such a goal. Unquestionably the medical profession has achieved the professional stature and standing and a high degree of unity which engineers can envy and for which they may hope. However, the AMA alone is but one expression of these attributes and is only one vehicle for obtaining them.

Here is what one medical authority has said about the problem confronting the engineering profession and how the AMA relates to it:

"As it is organized the AMA represents a federation of state and territorial associations, each of which is autonomous in its own right. Interestingly enough these organizations are not chartered by the AMA but are banded together voluntarily to form the AMA. Conversely the state organizations generally charter their own component county medical societies. The only hold of the state association on the county societies is the charter which is issued and which requires the county societies to operate in conformity with the constitution and bylaws of the state association. *You will readily see that this position of independence for each component unit serves effectively in organizing the profession from the grass roots up, rather than from the top down.* Many people feel that this form of organization offers a greater strength than a unilateral setup enforced from the top down rather than springing from the base."

Such an expression throws cold water on the present and, up to now, futile attempts to make the Engineers Joint Council serve as a unity organization for all engineers. What is needed is grass roots resolution and a grass roots revolution.

You Can Say That Again

IN this country through the incentive of reward for personal initiative, you find the maximum utilization of electric service. In the modern home alone there are more than fifty applications. They eliminate the drudgery from housekeeping, preserve foods, control the atmosphere, bring entertainment, decorate and illuminate the home and make contributions to health through therapeutical applications. Small wonder then that the use of electric service has been more than doubled during the past ten years by our average residential customer. The many applications of electric service have enabled our customers to dispense with the cost of servants and other services and have brought comfort and conveniences to the home which have greatly enhanced its livability. It is our privilege to be engaged in rendering this modern and essential service, but along with this privilege goes the responsibility of seeing that it is always adequate and dependable. We must keep in mind also that the human element is a most important ingredient of any service and, therefore, it should be our aim and purpose to discharge our duties and conduct ourselves in such a manner as to merit the confidence and respect of those we serve.—John E. Loiseau, president, Public Service Company of Colorado.

Broadway in San Diego, dark for 35 days while new mercury street lighting units and standards were installed, was ablaze again at a civic Jubilee celebration Aug. 3

First electric cluster street lights in the '90s sung about by a pageant quartet

Jubilee Lights up Promotions

Jubilee fever is rising everywhere in the West as October nears. For the two weeks from Oct. 18-30 will bring to climax a complex of national observances, promotions, shows and celebrations of the invention of the electric incandescent lamp by Thomas Alva Edison, Oct. 21, 1879. National Electrical Week, sponsored by the International Association of Electrical Inspectors runs from Oct. 18-24. And the biggest TV show in history to celebrate the diamond jubilee of light will go on over all networks on Sunday Oct. 24.

All year the numerous conventions, conferences, meetings and shows of the electrical industry have linked themselves with this year's celebration. In practically every area in the West plans are being made to tie some electrical promotion to the jubilee from now to Oct. 30. Details of two big promotions of this type have been worked out to a degree worth noting—the San Diego "Sell-a-bration Days" and the northern California "Edison Light's Diamond Jubilee" promotion.

San Diego really began celebrating early in the year. As always it seized upon the promotional idea the year affords to which to tie its numerous events. Latest of these was the big program staged by the Downtown Assn. when the city of San Diego turned on new mercury street lighting along a 16-block section of Broadway from Harbor Drive to Eighth Avenue on Aug. 3. Some 5,000 people jammed the Horton Plaza where a stage had been set up. On it a series of scenes enacted days of the original gas street lights, the first electric cluster standards, the two-lamp ornamental standards just replaced, and finally a ceremony at which Miss San Diego closed a replica switch and the mercury system was turned on.

Other events on San Diego's calendar included Farm Electrification week Aug. 16-22 in conjunction with the county fair. The biggest promotion will be the Diamond Jubilee Sell-a-bration Days, Oct. 18-30, combining a selling and display program by the Bureau of Home Appliances and some 400 dealers, special sections in the newspapers, and San Diego Gas & Electric will put into service the first unit of its new Encina plant. Even a civic banquet honoring the county's electrical pioneers is planned.

Then the bureau's annual Electric and Home Appliance Show, Nov. 26-Dec. 1, will have "then and now" exhibits. The Ice Cycles of 1954 will have an opening Diamond Jubilee number, Nov. 15. And the Junior Chamber of Commerce will sponsor a special Christmas lighting promotion starting Nov. 26.

Northern California Electrical Bureau also has plans for the same Oct. 18-30 period to tie in with the tremendous national publicity. Its promotion is wrapped around a $20,000 appliance and TV set prize drawing to electric customers in Pacific Gas and Electric Co. territory. The grand prize will be $1,650 worth of appliances with which to equip an electric kitchen (including range, refrigerator, dishwasher and disposer; plus four major housewares, the mixer, toaster, coffee maker and blender). Then there will be 35 major appliance or TV set prizes of the contestant's own choosing, and 5,000 200-w new small-size incandescent lamps.

The straight give-away, with nothing to write or buy, will be promoted by PG and E in big ads, bill stuffer entry blanks, radio spots and window banners and cards of Edison's portrait in dealer stores. The entry blanks invite the company's customers to go select the kind and model of appliance or TV set they want at an identified dealer's store and drop their entry with name and address in company offices or dealer stores.

Local units of the bureau will hold meetings to set up as big a local promotion as possible to capitalize upon the floor traffic the contest is expected to bring. Demonstrations in stores, cooking schools, electrical parades or shows, local window trim contests, luncheon club talks and showings of a Jubilee film, *Eager Minds,* will be arranged. The window trim material consists of banners, a window card of Edison's portrait and diamond shaped cards to be taped to the top-of-the-line appliances available as prizes in the contest.

Arizona began early in the year to tie to the Jubilee. The picture on the cover is of a huge plaque used in a celebration by Arizona Public Service Co. in April at the time of lighting a public park for night baseball. Alexandra Bakowicz, 14-year-old escapee

(Continued on Page 118)

ELECTRICAL WEST Sales Guide

News Letter

September 1954

FOR THE ELECTRICAL MERCHANT OF THE WEST

Lest we get too cocky about America's record of appliance invention and sale, a picture spread in the English magazine, Electrical Review for July 1954, shows electric appliances offered for sale by City of London Electric Lighting Co. Ltd. in 1894, 60 years ago. They look very similar to present appliances too--electric hotplates, plate warmer, coffee urn, tea kettles, electric saucepans, flat irons and tailors iron, a radiator (radiant space heater) and an electric oven with a hotplate top that is an electric range. The first electric cooking demonstration, Ray Turnbull of G-E says, was held at the London Exhibition in 1890. The first range in America, really a table with a number of table appliances on it, was made about 1904.

England, not Russia

Just a reminder to make the most of all the national and local promotion of things electrical that will climax Oct. 24 with the big all-network TV show celebrating Light's Diamond Jubilee, 75 years since the invention of the incandescent lamp by Thomas Edison. These range all the way from window displays on up to San Diego Bureau of Home Appliance's Sell-a-Bration, Northern California Electrical Bureau's $20,000 prize give-away promotion--Edison Light's Diamond Jubilee--or Montana Power and Idaho Power lamp bulb campaigns, floor and table lamp sales, or El Paso Electric's Diamond Range Jubilee. Whatever's doing, join it.

Play it big

It's all-out war now on the discount racket as big department stores and chains like Sears are lowering the boom (and prices) to combat the brokers. The discounters have received so much publicity free that it is a question whether, in the cities at least, all retail appliance business may descend to the low-margin, no-service level where there'll be no advantage left to the discounter since everybody is one.

Who'll survive?

Philco took a drastic step. It canceled all franchises, put some iron in its distributor contract, told them to control the supply, declared it would exert factory inventory control and together stop transshipping that feeds the discount house. . . Magnavox also canceled all franchises and selectively refranchised.

Strong measures

Sloane's is one of the latest to drop appliances. Sherman Clay stores have done so also. In San Francisco The White House did so long ago. In San Diego Whitney's appliance store in the North Park district is being converted to sell other merchandise, de-emphasizing appliances. The Penny Ousley music stores in Los Angeles dropped all radio and TV. Discounters have to put in displays themselves to show customers. One complained to a dealer because the latter had given a wrong model number.

Throw in the towel

Wiring plans

Sounds as though Spokane area will have a wiring finance plan in the hint dropped by Washington Water Power Co. announcing a series of meetings in October. The fourth-quarter sales campaign of Inland Empire Electrical League will also be told then. The residential lighting promotion is included with an appliance drive. . . PG and E's long-awaited wiring finance plan turns out to be an announcement of four plans by four loaning agencies, Bank of America, American Trust Co., Anglo-California and Morris Plan. Each will finance wiring for installation of a 220-v appliance for home owners along with the appliance. B of A's plan requires recourse to the dealer.

Top talent

NARDA's dealer profit clinic in San Francisco will hear top-flight speakers. Besides H. B. Price Jr., NARDA vice-president, Norfolk, the two Scaife's, Howard of Hotpoint, Chicago, and Art of Small Appliance Div., G-E, Bridgeport; Joe Rushton, Frigidaire's major dealer executive; Jesse Cartwright, Norge's home service director; Russ Hanson, Motorola's contract division manager; O. R. Doerr, v-p of sales, PG and E; and A. F. Wagele, B of A credit expert. Date is Sept. 17, Green Room, Western Merchandise Mart.

Junk cleanup

Old ranges turned in for junking during Utah Power & Light's 60-day range campaign totaled 2,040 from 541 dealers; 1,315 of which were electric, 218 gas, 484 coal. Five dealers turned in over 50, 15 over 25 and an average of 7 per dealer was reached.

Action this fall

Among special activities this fall: Montana Power has three: (1) A pin-up and portable lamp sale by company and dealers in a mail-order drive; (2) Lamp bulb drive giving a 200-w free with purchase of six standards; (3) A return of the successful rural sales campaign, among 13,385 eligible customers with a goal of 4,300 units. Customers contacted personally are given certificates worth $10 or $25, applied to purchase of listed appliances from dealers. . . Idaho Power has a light bulb promotion tied to the Jubilee sponsored by eight wholesalers Sept. 13 to Oct. 31. . . El Paso Electric--dealers share in the cost of contest prizes in its Diamond Range Jubilee campaign. . . A series of fall appliance shows is scheduled by Arizona Public Service and dealers.

Washed out

Thor Corp.'s short entry into the built-in electric range, refrigerator and freezer field is over, it has announced. Will now concentrate on its new laundry appliances.

3-ring circus

With an annual fall conference Sept. 15, "Sell-a-Bration Days" with Light's Diamond Jubilee promotion Oct. 18-30, and its big annual electrical and home appliance show beginning Nov. 26 through Dec. 1, San Diego Bureau of Home Appliances is jumping with activity. Besides this, several side shows--TV service program, electric houseware clinics in October and new officers elected--are all included. For the conference, headline speakers will be Glen McDaniel, president of Radio, Electronics & TV Manufacturers Assn., New York City, and George Melinger, Westinghouse s-m of Major Appliance Division. Other speakers will be Harry Gough, G-E Western Division, Major Appliances, James Graham Jr., Rheem-Wedgewood, Newark, H. G. Dillin, executive v-p, San Diego Gas & Electric, and Howard R. Patterson, general manager, Chromatic TV Laboratories, Oakland. The CBS network color show, "The Royal Family," will be brought to the House of Hospitality Auditorium at 7 p.m. by a number of color sets. New officers to be installed include Lee Bornstein, Lee Distributing Co., president; Ivan Lauritzen, San Diego Vocational School, first v-p; Jerry Heilbron, Heilbron Electrical Co., second v-p; Sam L. Hall, Electric Supplies Distributing Co., treasurer; Robert D. Halvorson, La Jolla, immediate past president.

Color is back

Color telecasting began again in late August and the series of spectaculars by NBC are scheduled in September. Meanwhile, RCA lowered prices on 15-in. TV sets it has built so far to $495 with a dealer refund. . . Westinghouse's 15-in. color sets were cut to $595 from $1,100, also with dealer rebates. . . Emerson already had lowered its price to $695. . . Raytheon's president said the $500 large-screen TV would not be here 'til 1957. . . Sylvania's Arthur A. Currie, sales manager for radio and TV, on a Western trip said Sylvania would not make color sets until the size of the tube question settled down. . . CBS-Columbia introduced a line of 19-in. color TV sets at eastern showings. . . Olympic Radio & TV is said to have a projection color set coming out soon. . . A converter to sell for about $50 is being developed in Fresno by Colored Television Co. . . First color signals broadcast on the local facilities in San Francisco came on KRON-TV in mid-August. . . American Tel & Tel will have about 40,000 channel miles equipped for color TV to serve 94 cities by year's end.

Second sets

With high TV saturation in some areas, attention is turning to selling of second sets and of trade-in problems. Admiral Corp. had Woodbury College in Los Angeles make a survey among 1,200 families. 24% said a second set for the children to watch would be a prime inducement. The poll also showed only a third had 21-in. sets, a quarter had 14-in. or smaller. . . Motorola Inc. has a plan to guide dealers in appraising used sets, reconditioning and reselling them.

Built-ins admitted

While the new housing act may stimulate more home building, it's rough on appliances. New rules limit FHA coverage to those actually built in. Even its open-end mortgage provision has this limitation. . . The U. S. Savings and Loan League, however, is promoting a "Flexible mortgage contract" that would include refrigerators, stoves and laundry equipment.

Two good men

John L. Nicolay, who managed the Capehart appliance division of Thompson & Holmes Ltd., San Francisco, died of a heart attack Aug. 8. He had been with Thompson & Holmes 15 years, part of the time in Sacramento as branch manager. . . In Seattle, Frigidaire's manager at Sunset Electric, James W. Condon, died Aug. 29 of a heart attack while at Portland. He had been with Sunset for 20 years.

Service provided

All home appliances formerly manufactured by General Mills will be serviced on a national basis by Appliance Service Co., Minneapolis. The latter plans to utilize facilities of many GM service stations throughout the country. McGraw Electric recently acquired General Mills appliances.

Still shifting

More distribution changes: G-E Co. appointed the Hall Co. as an additional wholesale distributor of G-E radios for southern California and southern Nevada and part of Arizona. Hall Co. is a housewares distributor. . . Devlin Drew Co. of Fresno was named distributor for Eureka vacuum cleaners for the San Joaquin Valley. . . Magnecord Inc. appointed Huber Distributing Co. in San Francisco for northern California and Western States Distributors, Salt Lake City, for Utah, Idaho and Montana. . . Hoffman announces Treasure State Gas & Electric, Butte, as Montana distributor. It also handles Whirlpool, Servel and Magic Chef. In Portland, Thomas Mumford, formerly with Hoffman Sales of Los Angeles, has been made general manager of the Oregon operation. . . Admiral has named ZCMI Wholesale Distributors of Salt Lake City as exclusive distributor for Admiral products in the intermountain territory. . . International Harvester may go direct to dealers, as Thompson-Diggs Co. of Sacramento gives up the line.

Norge change, rumored last month, with the appointment of Leo J. Meyberg Co. of San Francisco, was confirmed with added word that Harry Dooley & Co. is now Fresno distributor at 725 L St., and in San Diego it is Nystrom Bros. Inc. . . CBS-Columbia has appointed Quality TV Corp., 1235 E. Olympic Blvd., as its distributor in the Los Angeles-Southern California area. Apparently Salt Lake City distribution is now handled by Edward M. Abrahams, recently of the Paris Co., and Edward Moreau in a new distributorship. . . Revco food freezers will be handled in Oregon by Cryder Sales Co., in Washington by Modern Heating & Supply, Seattle.

More changes

People who made news: Bob S. Sloan, for many years with Westinghouse Electric Supply, San Francisco, has been appointed appliance division sales manager of the Ray Thomas Co., Los Angeles, replacing John G. Watts, who takes a metropolitan assignment for the company. . . Frank W. Courtright, former v-p of the NAHB, was made director of builders research for the Mullins Mfg. Corp., makers of Youngstown Kitchens. His headquarters will be in Western Merchandise Mart. . . Marcia Mead of California Electric Supply, San Francisco, becomes national director of the home economics department of Whirlpool, St. Joseph, Mich. . . Charles A. Green was appointed regional s-m for Whirlpool for Colorado and Texas. . . Thor Corp.'s zone manager to cover New Mexico is H. W. Luker, 2112 Ashland St., Fort Worth. . . Glenn G. Geoffroy was made wholesale department manager of Easy Appliance Co. in Honolulu. . . R. H. Pizor, regional manager of Norge Borg-Warner Corp., moved from 703 Market St. to 295 Buckingham Way, San Francisco. . . James M. Scales, for many years with appliance and radio distributors, set up his own company, specializing in electronic equipment and supplies, with office at the Western Merchandise Mart, San Francisco. . . Martin B. Sauer was made consumer products s-m for the Pacific Region of Westinghouse Electric Supply. He moves from Los Angeles to the Western Merchandise Mart regional office in San Francisco. . . Gordon E. Wilkins formerly headed a distribution chain for Ironrite, etc., and is now president of Hawaiian Wholesale Factors, Honolulu. . . CBS-Columbia appointed Claus H. Schumacher its Western regional service manager with headquarters at 92 Moneta Way, San Francisco. . . Norfleet Callicott, for the past two years general manager of Hoffman Sales Corp. of Oregon, in Portland, has moved to Kansas City as head of the sales corporation there. . . Ted L. Van Law succeeds Henry C. Rice as director of sales for Southern California Edison Co. . . Warren C. Johnson has been appointed director of sales for the home laundry division of Electrical Distributors Ltd., Honolulu.

Where they are now

With a big-time show, General Electric presented its new line of TV to 1,400 dealers in southern California at the Carthay Circle Theater Aug. 10. Radio-screen stars Ray Milland and Phyllis Avery, featured on G-E's show, were among the entertainers. Arthur A. Brandt, manager of radio and TV dept. sales, and Steve Perkins, southern California manager, presented the line. Major new feature was the "Lo-Boy" TV console. A six-year-old rode into it with a tricycle full tilt to see if it could take it.

Big-time show

A course to teach good public relations in selling, sponsored by the Salt Lake Retail Chapter of the IEA, begins Sept. 14 at the Board of Education Bldg. Auditorium, taught by H. Ward McCarty.

Training

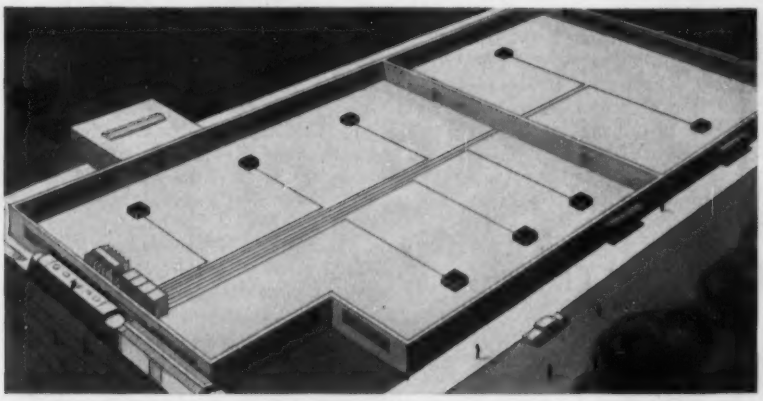
More entries in the power tool business. Sunbeam Corp. will have a line of drills and saws. It recently introduced a reel-type mower. . . Dormeyer, who bought Camfield recently, will also bring out some power tools in January.

Home repairs

WIRE AND CABLE INFORMATION DIGEST

Planned Electrical Modernization

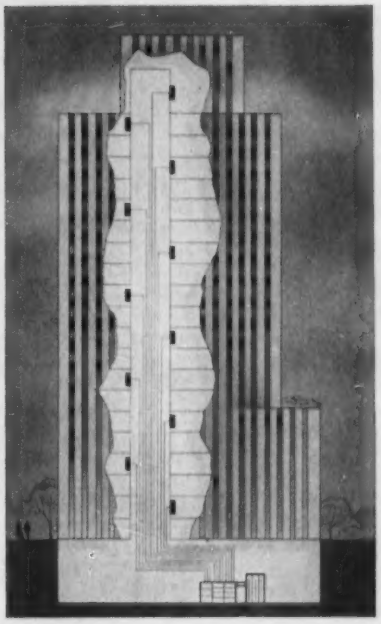
to prepare for growing loads



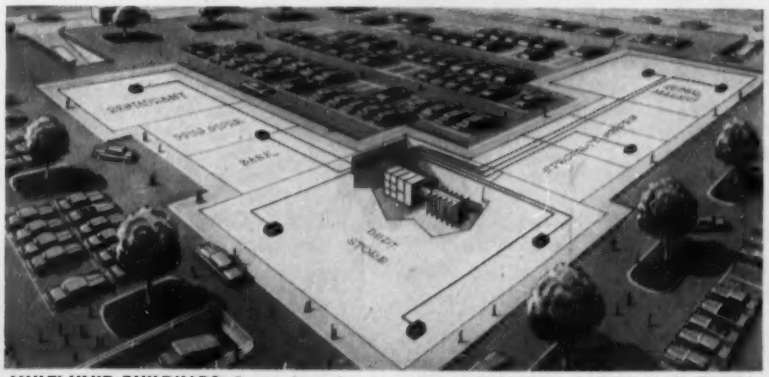
INDUSTRIAL PLANTS. General Electric job-planned cable systems are designed to absorb load increases without major modifications. For example, a feeder system of flexible G-E interlocked armor cables will let you add or relocate circuits easily, as loads increase and circuit requirements change. For incoming leads and primary feeders buried directly in the ground, installed in underground ducts, or in conduit, G-E Super Coronol* cable's normal rating (85 C up to 15,000 volts) and its emergency rating (up to 115 C depending on the voltage) give you reserve capacity.

*Registered Trade-mark General Electric Company

G-E V-c INTERLOCKED ARMOR CABLE primary or secondary feeder systems can be installed quickly, and can be easily expanded or relocated to accomodate changes in load patterns—because each circuit is a separate, flexible cable that needs no conduit.



MULTI-STORY BUILDINGS. Growing loads here can be met by running primary feeders up the service shaft, and stepping down to utilization voltage on the upper floors.



MULTI-UNIT BUILDINGS. In a shopping center, power requirements often change drastically—for example, when air conditioning is added. A G-E cable system, planned for flexibility, solves the problem.

For help in planning a cable system

that allows for future expansion, write for these helpful booklets on G-E cables, or call the G-E wire and cable specialist in your locality. Section W134-925, Construction Materials Division, General Electric Company, Bridgeport 2, Conn.

REWIRE AMERICA

Progress Is Our Most Important Product

GENERAL ELECTRIC

Jubilee Promotions

Starts on Page 106

from the iron curtain Ukraine, lighted a candle to symbolize freedom and truth and the Edison plaque lighted, the park lights went on and the G-E 75,000-w lamp bulb was lighted. Alston Rodgers of G-E, W. P. Reilly, vice-president of Arizona Public Service, and Mayor Frank Murphy of Phoenix spoke.

The spring fair of Appliance Merchandisers Assn. was linked to the Jubilee, using the same exhibits. Now as October approaches a whole series of shows in all the towns served by the company are scheduled from Sept. 9-10 in Holbrook to Nov. 16-17 in Yuma. AMA itself has its Fall TV Festival scheduled for Sept. 24-26 and a concentrated promotion of displays, ads and appliance demonstrations in the stores of Phoenix.

Hawaii will honor Edison with the opening on Oct. 21 of an electrical Dream Home, sponsored by the Honolulu *Advertiser* and Lewers & Cooke Co. and Hawaiian Electric Co. Ltd. Electric light first came to Honolulu in August of 1891. The dream home is in the new Waialae-Kahala residential district.

Montana Power Co., throughout the year, has linked its sales program and publicity to the Jubilee. Instead of a traveling show this year it has staged a number of cooking contests at which Light's Jubilee was the theme. Then the company has prepared a spectacular float, representing Kerr Dam and carrying Jubilee plaques, that is being taken everywhere over the system and used in parades and at local fairs and events. In Butte and Bozeman contrasting windows were set up. In one is a modern electric kitchen. In the other a replica of Mrs. Sarah Jordan's kitchen in Menlo Park, where Thomas Edison boarded about the time he invented the lamp. Historic furnishings for it were borrowed from Montana's historic mining town, Virginia City.

These are but a few of the observances and promotions tied to this jubilee theme throughout the West.

Difference Pays

Wiring allowance of $15 toward electric clothes dryer installation will be featured in Los Angeles Department of Water & Power area from Oct. 1 to Dec. 31 in the sales campaign handled by the Los Angeles Electric League. Announcements in advertising, direct mail, window displays and demonstrations will begin Sept. 15.

The allowance by the department is a $15 wiring reimbursement certificate issued to the vendor, builder, owner or occupant of a single or multiple dwelling who agrees to install the clothes dryer between the dates, or in homes under construction before March 31, 1955. It applies to all 230-v dryers.

With the department's reimbursement, electric clothes dryers including installation cost will be no more and in many instances less than the installed prices of gas dryers. Details of the campaign will be given in a series of dealer meetings and bulletins.

Narda Profit Clinics

A change in dates is to be noted in the series of Profit Clinics to be staged in the West by NARDA groups in September. The San Francisco meeting remains Sept. 17 and will be held in the Green Room of the Western Merchandise Mart. No evening meeting is contemplated.

H. B. Price, vice-president of National Appliance and Radio-TV Dealers Assn., of Norfolk, Va., and Al Bernsohn, managing director, are scheduled to attend this and the other three meetings. Second meeting will be held in Portland Sept. 20. In Seattle, the Northwest Appliance & Television Assn. will sponsor the meeting Sept. 22 at the Ben Franklin Hotel. At Billings, the meeting will be Sept. 24 with Cecil Musberger in charge.

Additional speakers on the Seattle program have been announced as Leo Weisfield, president of Weisfield's stores, and Jessie Cartwright, home service director of the Norge Home Institute. That association's new managing director is J. H. Marks, who has been affiliated with the industry as distributor and manufacturers' agent since 1928.

At San Francisco speakers will include Jessie Cartright of Norge; Russell Hanson of Motorola; a Bank of America executive on financing; Joe Rushton of Frigidaire; both the Scaife brothers, Art of General Electric and Howard of Hotpoint and O. R. Doerr, vice-president of sales of Pacific Gas and Electric Co. Carl Hagstrom, NARDA vice-president for the Pacific region, will be in charge; may go to the Seattle meeting.

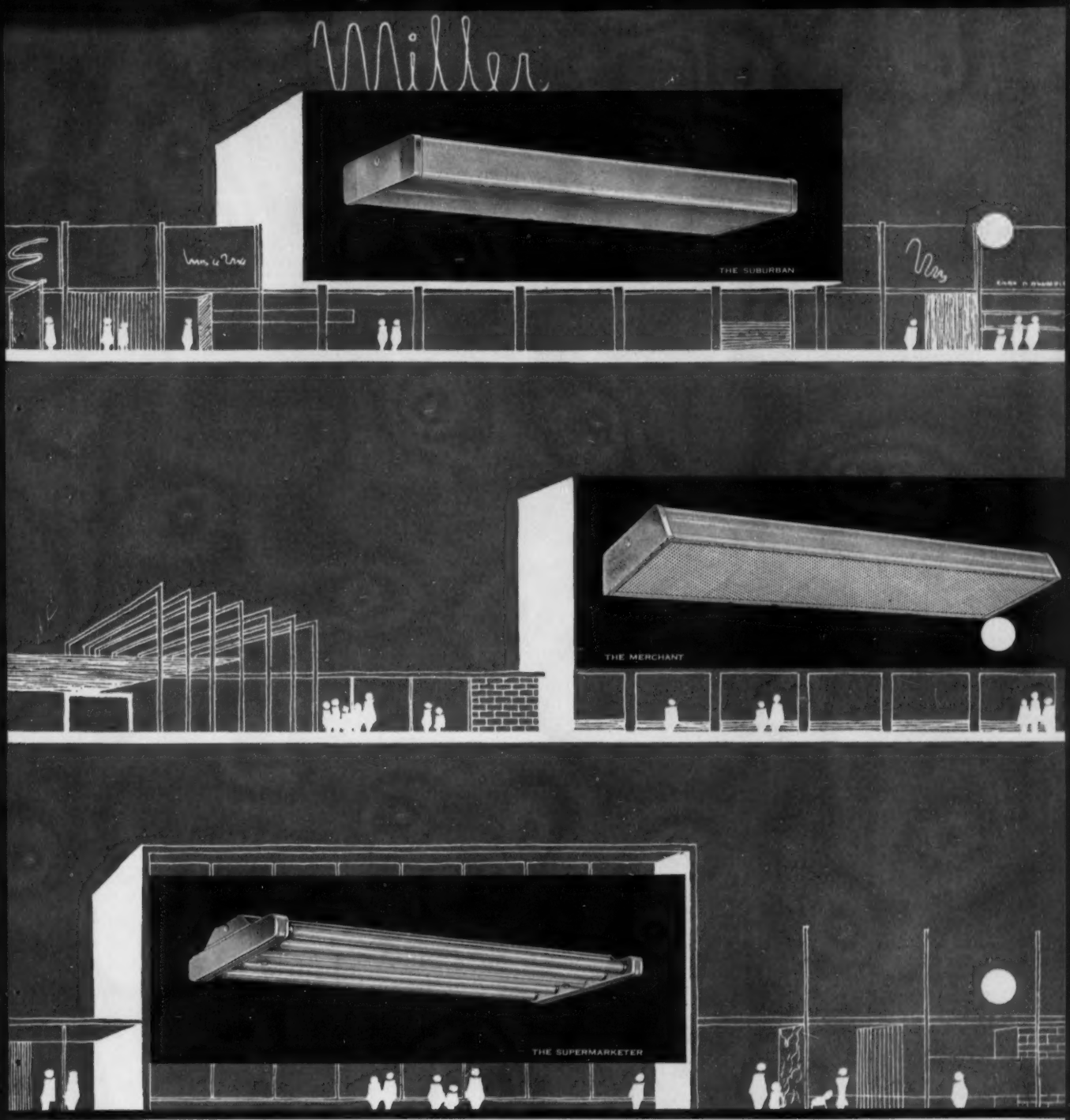
Sylvania Set for Seven Plans

Look for seven light bulb merchandising plans that are revolutionary and typically Western from Sylvania this fall and winter. To hear what they are prepare for them, and to hear all about Sylvania from its top lights some 40 executives and Western representatives from nine Western states met Aug. 19 at Carmel, Calif. Charles A. Burton, general sales manager of lighting, Sylvania Electric Products Inc. led the headquarters team that briefed the sales staff on fall plans and promotions. Garlan Morse, Pacific Coast director of sales, complimented his men on chalking up the greatest gains in the company.

Burton said, "This is the first time we have gathered all our representatives in the West for the purpose of planning sales campaigns in lighting products exclusively." It was the last, he said, of three such meetings, the others in Portsmouth and Chicago. Burton also said that Western merchandising ideas have set the pace so rapidly in retail merchandising of light bulbs that H. L. Schreiner, former retail sales representative in Los Angeles, had been transferred to New York to direct the national accounts program. It was Schreiner who unwrapped the seven plans to the group.

L. P. Pleasants, division merchandising manager, told of the company's huge promotion budget and observed that 50% of the expansion of the market for fluorescent lamps had been gained by Sylvania in recent years. A. L. Kendall, general manager for fixture operations, pointed to the opportunities in the West's construction boom. J. G. Hearn, new sales manager of fixtures, introduced the Sono-Lume unit, combining sound and light control and the Sylvan-Aire, the new wall-to-wall lighting system. Ted Sargent, lamp chemist, told of a new "super de luxe cool white" lamp with a better spectral energy curve for color merchandising needs. Also it was announced that Sylvania now makes all types of lamps in general use—mercury vapor, colored reflector, sunlamps, heat lamps, new fluorescent types.

More said the West's importance justified location of three district warehouses here, the latest at Vail Field, Los Angeles.



PROFIT WITH NEW MILLER FLUORESCENT STORE LIGHTING FIXTURES

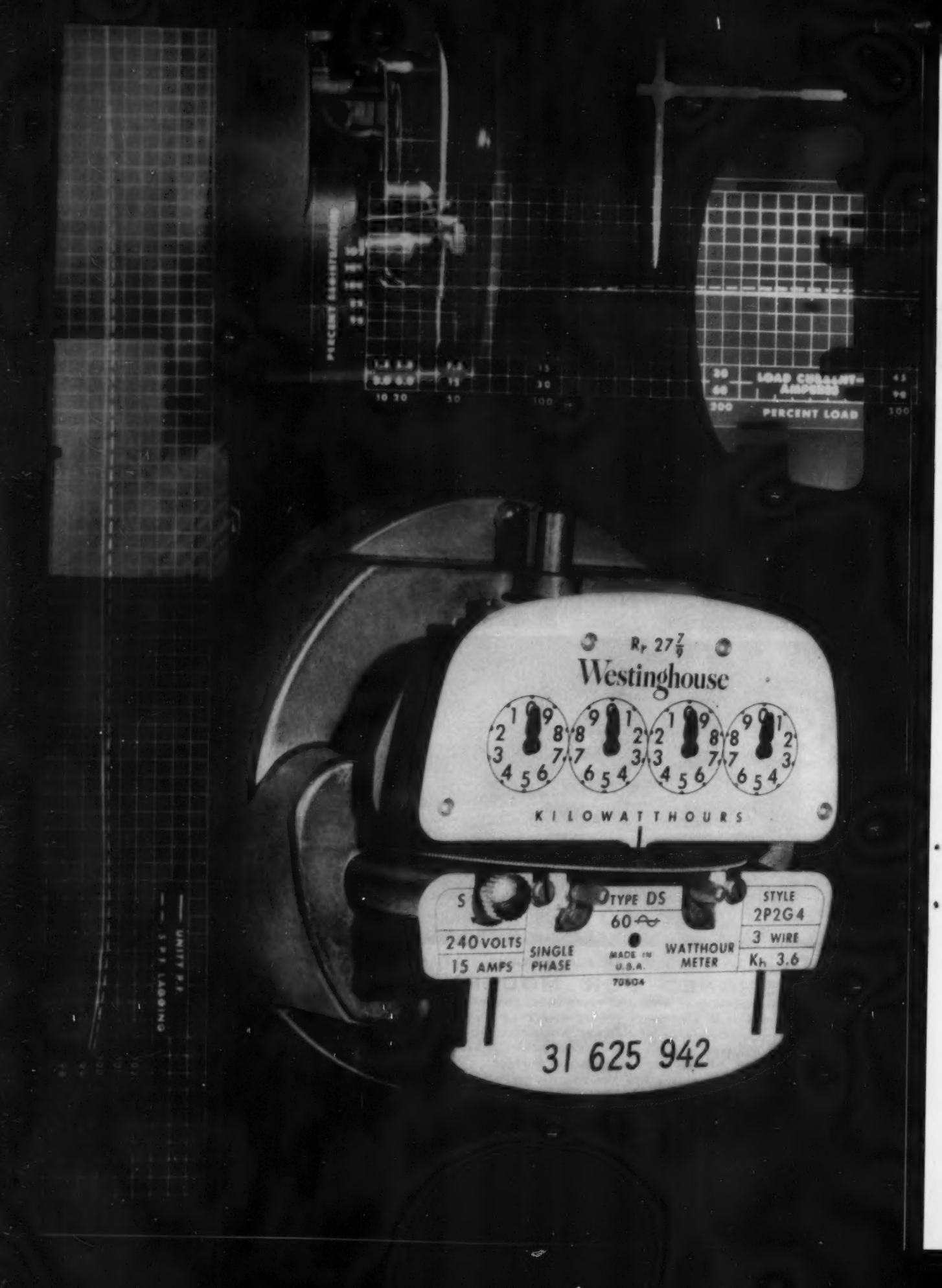
DESIGNED FOR MODERN SHOPPING

DO YOU KNOW THAT WITH JUST THESE THREE FIXTURE TYPES YOU CAN SELL LIGHTING TO STORES OF ALL TYPES? IT'S AS SIMPLE AS THAT. MILLER HAS DESIGNED THIS EXCITING NEW FAMILY OF FIXTURES SPECIFICALLY FOR MODERN SHOPPING. WE HAVE MADE IT A SHORT LINE, AND A PACKAGED LINE . . . EVERY FIXTURE COMPLETE, READY FOR YOUR PICK UP FROM DISTRIBUTOR STOCKS.

THERE'S BIG BUSINESS FOR THE CONTRACTOR WITH THESE NEW MILLER FIXTURES, ON EVERY BUSINESS STREET IN EVERY CITY AND TOWN, WHERE STORES BY THE THOUSANDS ARE STRUGGLING ALONG WITH INADEQUATE LIGHTING SYSTEMS. TO HELP GET THIS BUSINESS WE ARE MAKING AVAILABLE TO THE ELECTRICAL CONTRACTOR THE BIGGEST SET OF SELLING TOOLS EVER PROJECTED, PRACTICAL HELPS THAT ENABLE HIM TO FOLLOW THROUGH ON THE EDUCATIONAL WORK OF NEMA AND NECA, TO CASH IN ON IT. CONTRACTORS ARE INVITED TO WRITE FOR A COPY OF THE NEW MILLER SALES PROSPECTUS.

miller●

● THE MILLER COMPANY, MERIDEN, CONN. LEADERS IN LIGHTING SINCE 1844.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PERCENT LOAD

Helping the industry meet its growing loads

New Lifetime Meter will handle all single-phase loads

Electric utilities are now faced with the necessity of replacing many old meter installations because they do not have the range and thermal capacity required for modern loads.

For the replacement of such meters and to provide for any single-phase metering requirements in the foreseeable future, Westinghouse has introduced the Lifetime Meter—a meter with a truly amazing range. It will measure accurately all loads from less than 0.1 ampere to 200 amperes.

Lifetime Meters are offered in two ratings—Type A (bottom-connected construction) and Type S (socket construction) to handle loads up to 100 amperes, and in the S-mounting to handle up to 200 amperes.

The American watthour meter industry has for many years produced a high-quality product from the standpoint of economy, accuracy and long life. Westinghouse has contributed much to this high state of development. Over 66 years* of experience in the design and manufacture of watthour meters have been incorporated by Westinghouse engineers into this new Lifetime Meter . . . and the extended development work required has paid off by making it a better product.

The final result is a more simplified and highly perfected meter—made possible by the most modern engineering and materials. So far advanced is the Lifetime Meter that it can be guaranteed for thirty years.

This guarantee emphasizes the validity of every claim made for this new meter . . . truly a Lifetime Meter. J-97184

*Shallenberger Meter—1888

YOU CAN BE SURE... IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

Lightning surge protection

Here's how the problem of lightning surge damage has been handled in the Lifetime Meter. Both the current and the potential coils in the meter have a 10,000-volt insulation level. The socket-type meter has a De-ion® arrester gap located in the back of the base and arranged to discharge outside of the meter. In the bottom-connected (A-base) meter, a relief gap is provided between the series winding and the base. The gaps discharge at 4500 volts, well under the 10,000-volt insulation level of the coils, draining off surges safely.

Corrosion protection

The Lifetime Meter represents a sound approach to the truly corrosion-proof design, a vital factor in long life. The register gears and shafts have a gold finish. The socket-meter base is Moldarta*, a special, Westinghouse-developed plastic. The laminations in the electromagnet are Bonderized, the most effective finish yet found for locking out corrosion at this vital point.

The cover rim and sealing ring are iridited aluminum. All materials and finishes are selected and co-ordinated to give maximum protection against corrosion.

*T. M.

Stability

In order to provide long-life accuracy, a meter must have mechanical, electrical and magnetic stability. Here is how these qualities have been achieved in the Lifetime Meter. Every part of the meter is built and controlled within tolerances that eliminate the need for any adjustments in order to make parts fit. There is no chance of any variation to cause accuracy changes in service.

The Lifetime Meter features the ball and jewel bearing, pioneered by Westinghouse in 1902; the only time-proved lifetime bearing. Action is unimpaired, even under extreme overloads.

Graduating estimators from Northern California Chapter NECA course: Arthur Mills, George Sweet, Angelo Merletti, James P. Lydon, Park H. Klinow, Joe Lopez, James R. Colvin, Harry Thompson, Edgar Chloupek, Victor Myers, Robert F. Kelly, John Pinzini and Burch White Jr. Seated are Instructor Henry Tilson, Walter Vance, George Curran and Ed Buttner, NECA officers

15 Estimators Graduate

The estimating course of National Electrical Contractors is a long one and those who graduate from it really mean business. Northern California Chapter, NECA, had 15 graduates from its course which ran 64 meetings over a period of two years with Henry M. Tilson, electrical engineer, as instructor. Certificates were presented July 16 at a dinner at Hotel Claremont, attended by graduates, their wives and employers, chapter officials and Miss Marian Malloy, principal of night school, Merritt School of Business, Oakland. The dinner was presided over by Walter Vance, California Electric Co., president of the chapter, and George Curran, Red Top Electric Co., Emeryville, chairman of the educational committee.

Graduates were Edgar V. Chloupek, Robert F. Kelly, Arthur E. Mills of California Electric Co., Oakland; James R. Colvin and James P. Lydon of J. W. Ellis, Vallejo; Parke H. Klinow, Conrad Electric, Oakland; John Pinzini and Harry Thompson, Red Top Electric.; George Sweet, Stanley Pearce Electric, Vallejo; Knute M. Knutsen, Jones Electric, Hayward; Victor B. Myers, Scott-Buttner Electric, Oakland; Angelo Merletti, Paramount Electric, Oakland; Joe Lopez, El Cerrito Electric, El Cerrito; Burch White Jr., White Electric, Berkeley; and George L. Kelly of the T. L. Rosenberg Co., Oakland.

Ernest G. Kramm, manager, announced there were several others who had taken the course who might graduate later.

M. E. Lundberg, host to the IAEI Southwestern Section annual meeting at Elko, manager of Elko-Lamoile Power Co., plans a truly wild Western time for the visitors

IAEI

Inspectors from San Francisco Bay area may arrive at Elko for the Southwestern Section, International Association of Electrical Inspectors, annual meeting by chartered air conditioned bus. Del Hansen, chief electrical inspector, Oakland, and M. K. Bliss, secretary-treasurer, Northern California Chapter, are making the arrangements.

Contractors

Whether to participate in the formation of a national association of contractors in Canada was one of the major questions discussed at the third annual conference of the Electrical Contractors Assn. of B. C. at Nanaimo July 30-31. The B. C. Electrical Contractors Assn. itself is an affiliation of the Vancouver and Victoria Electrical Assn. and other independent contractor groups in the province. L. H. C. Jennings, editor, *Electrical Contractor*, Toronto, told of the advantages to be gained by a national association, including full-scale advertising and educational programs on estimating and business practices. The meeting of 124 delegates unanimously passed a recommendation that the executive committee consider the question and refer it to the member groups.

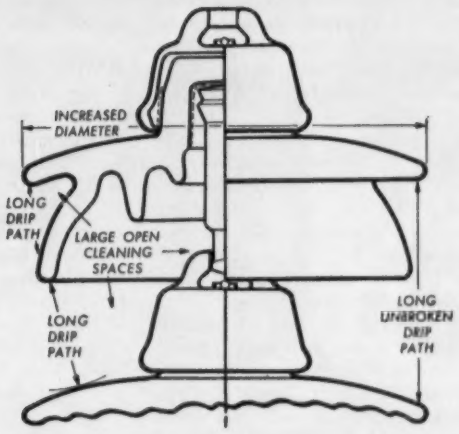
The program covered the contractor's relations to other groups in the industry and in the government, speakers from the various points of view being on the program. H. G. Horsman, Western vice-president of the Canadian Distributors' Assn., presented the supplier's point of view; C. W. Nash, district manager, B. C. Power Commission, Nanaimo; John H. Taylor, residential sales manager of B. C. Electric Co., Vancouver, presented utility views; Lance Robson, chief electrical inspector for the province, answered complaints and gave strong advice on code and inspection matters. He explained the workings of the Canadian Standards Assn. national code. Speakers from the banks and B. C. research council and a talk on service entrance equipment by J. R. Dooley, secretary-treasurer of the association, and J. L. Whitehead of the *Journal of Commerce Weekly* completed the program. W. Lockley of Mission, B. C., president of the association, presided. Leon Irvine, first vice-president, and C. Wear, second vice-president, handled the two business sessions.

6 design advantages of Locke's New

Fog-Type MICROGLAZE* Suspension Insulators

Note deep corrugations on easily reached protected under side of Locke Fog-Type Microglaze Insulators.

*Trademark of General Electric Company



1. LONG, PROTECTED LEAKAGE DISTANCE—Half of entire 17" effective leakage distance is on protected under side of insulator where entrapped warmth tends to dissipate fog and moisture. Deep corrugations on under side act as barriers, damping ionization and minimizing streamer formation. This reduces both audible and radio noise.

2. INCREASED IMPACT STRENGTH RATING of 55 inch-lb. results from improved design. High impact and mechanical strength is maintained by careful control of glaze uniformity and thickness which is typical of Microglaze insulators.

3. WIDE SPACING between units makes string assembly and cleaning in service much easier.

4. REDUCED NET WEIGHT lessens installation cost.

5. WIDER SPACING between skirts and between shells of adjacent units breaks up rain drip, reducing tendency to bridge over. This results in fewer flashovers, less radio noise and more reliable line operation.

6. RADIO INFLUENCE VOLTAGE is well below standard N.E.M.A. ratings under standard test conditions.

SPECIFY LOCKE'S new Fog-Type for operation in areas where heavy fog, smog, salt spray or industrial contamination demand maximum ratio of *effective* leakage distance to string length.

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LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND

NAED

As notices of the annual Pacific Zone annual convention of the National Association of Electrical Distributors are being made W. M. Jewell, manager, also reports of a highly successful meeting in the Los Angeles area. The zone convention will be at the Hotel Mark Hopkins, San Francisco, Oct. 3-6, and registration closes Sept. 10. All reservations are to be made through the secretary's office, 126 Post St., San Francisco 8.

A special "early birds" dinner is planned for Sunday night, Oct. 3. Members' executive meetings will take place Oct. 4. General meetings for members and guests will be Tuesday morning, Oct. 5, and Wednesday morning and afternoon. The annual banquet will be at 7:00 p.m., Oct. 6. W. B. Imholt, Electric Corp., San Francisco, is zone chairman.

How to team up with the home builders association to break the wiring bottleneck of service entrances was told the area luncheon Aug. 12 at the Los Angeles Biltmore ballroom when 300 attended. D. C. Slipher, technical director, Fritz Burns & Associates, chairman of the construction committee's subcommittee on interior wiring design of National Association of Home Builders, presented the talk he had given to the PCEA convention at Coronado. In it he urged concentration by the industry and home builders upon the voluntary standard of three No. 2 wires in 1¼-in. conduit and at least an eight-circuit panel with spare capacity for range, air conditioning.

The other featured speaker was A. H. Gudie, Biddle Trade Bureau, Los Angeles, whose talk, "The Throat You Cut May Be Your Own" was published in the May issue of ELECTRICAL WEST, p 63. He had previously given it to a San Francisco meeting of wholesalers and salesmen.

E. E. Karston, Gough Industries Inc., was local chairman. He had invited to the luncheon all wholesalers in the area whether members or not, manufacturers' representatives and agents, and leading contractors.

RMEL

An impressive list of speakers was programmed for the Rocky Mountain Electrical League's annual convention at the Stanley Hotel, Estes Park, Sept. 13-15. President M. M. Koch, Public Service Co. of Colorado, and Ralph Hubbard, manager, had promises from the following for participation on the programs of four sessions:

James T. Coatsworth, commercial director, Edison Electric Institute, New York; John T. Kimball, executive vice-president, Arizona Public Service Co., Phoenix; Robert Stevenson, executive vice-president, Allis-Chalmers Co., Milwaukee, on the Monday morning session and Fischer Black, publisher and editor, *Electrical World*, the luncheon speaker.

On the afternoon program, presided over by L. A. Goalby, Denver's Westinghouse Electric Corp. manager, with E. L. Robinson, general sales manager, Gulf States Utilities, Beaumont, Tex.; Robert B. McKee, vice-president, Aluminum Co. of America, Pittsburgh; Roger Bolin, assistant vice-president, Westinghouse Electric Corp., Mansfield; and the dinner speaker is W. H. Robinson Jr., advertising manager, General Electric Co., Lamp Division, Cleveland.

On Tuesday, presided over by James A. Chapman, vice-president and general manager, Rawlins Electric Co., the program will have Allen A. Smith, partner in Laing, Gray & Smith, Portland; W. D. Johnston, manager and vice-president, Mountain States Power Division, Pacific Power & Light, Casper, Wyo.; William V. O'Brien, vice-president and general manager, Apparatus Sales Division, General Electric Co., New York; and Ed Baumer, Western vice-president, Public Relations Society of America, Los Angeles.

The Wednesday program, under Warren A. Terry, vice-president and general manager, Home Light & Power Co., Greeley, will feature R. G. Kenyon, vice-president, Southern California Edison Co., Los Angeles; Herbert A. Leggett, vice-president, Valley National Bank, Phoenix; Frank W. Mansfield, director of sales research, Sylvania Inc., New York; and Ralph W. Carney, vice-president in charge of sales (retired), Coleman Co., Wichita.

Contractors of B. C.

All officers of the Associated Electrical Contractors of B. C., an organization of larger electrical contractors in the province (not to be confused with the Electrical Contractors of B. C.) was announced after an annual meeting. C. H. E. Williams is president, Howard Hume vice-president, D. C. Carter treasurer and V. Beaumont secretary. Directors are W. Vaughan, L. Sewell, H. J. Sayer, J. H. McRae and P. Wise.

In its own building the San Francisco Electrical Contractors Assn. has a small meeting hall and board room on the top floor. Directors Kleinhans, Bohlen, Newman, Governor Peak, President Weber, Directors Mahoney and Weider and Manager Varley are shown. On the second floor W. J. Varley, manager (President Emil Weber at right), has his luminous system lighted office adjacent to the business office presided over by Miss Wilson. Ground floor is rented to manufacturers' agents, Benefit Board and NECA

Choose the Fuse Link That Saves You Most

Standardized

New KEARNEY Type K and T Made to Meet EEI-NEMA Standards

Developed in cooperation with EEI and NEMA to provide industry-wide standard fast (K) and slow (T) fuse links . . . *plus* providing such exclusive KEARNEY features as:

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or Specialized

Type 200 . . . with extra heavy surge and overload capacity

Type KS . . . with the same surge capacity as Type 200, but twice the overload capacity

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Los Angeles • San Francisco • Portland • Seattle • Spokane • Phoenix

Whatever your fuse link needs . . . standardized or specialized . . . time-current curves and charts are available to help you work out your coordination problems.

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FOR BETTER CONSTRUCTION . . . FOR SAFER MAINTENANCE

ALLIS-CHALMERS
PROGRESS IN
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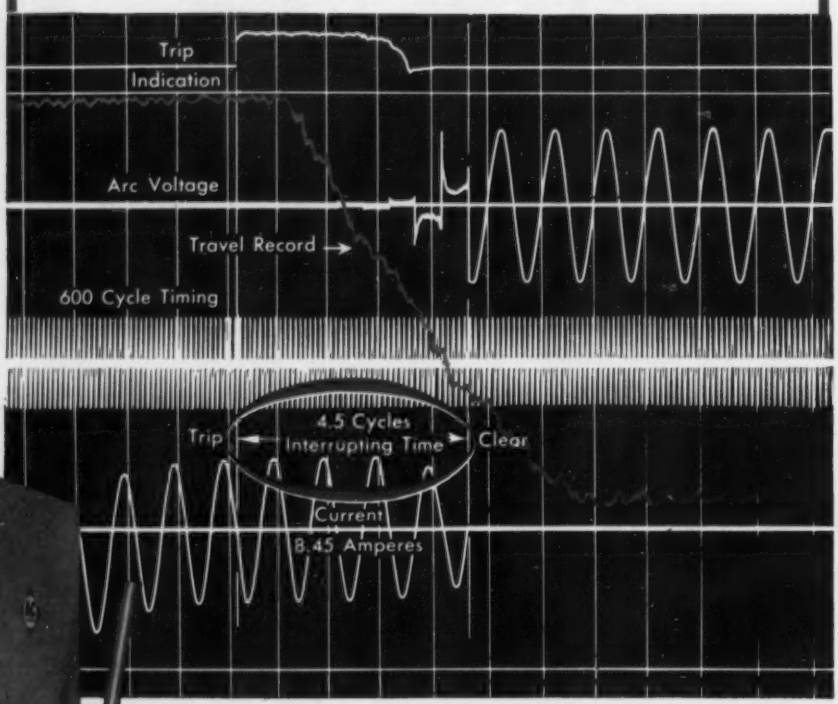
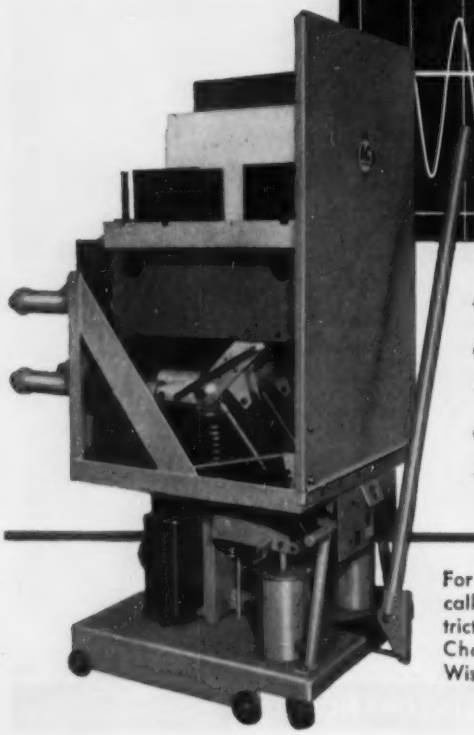
Here's ON NEW 13.8-kv METAL-

FAST ON LOW CURRENTS





4.5 cycle and 4.1 cycle interruptions shown here are well within 8 cycles allowed by the ASA standards for even heavy currents. Low current switching···always considered difficult··· now handled easily. Horizontal contact separation plus effective puffer design make this possible.

For additional information, call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4288

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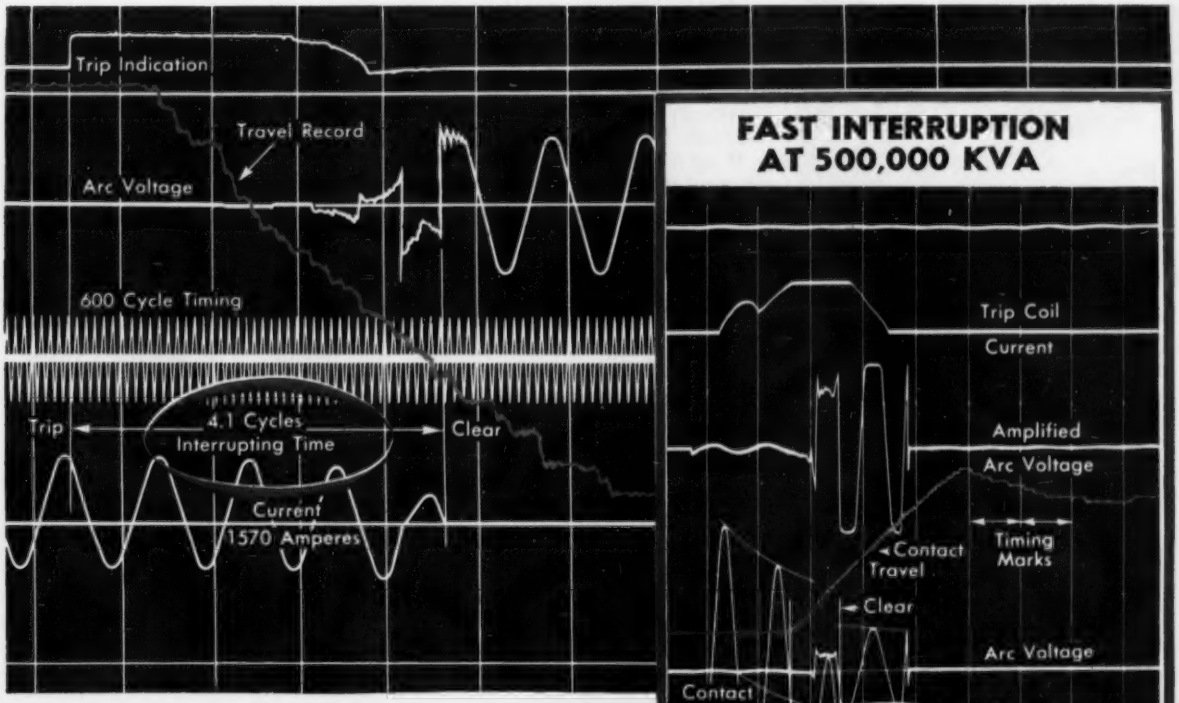
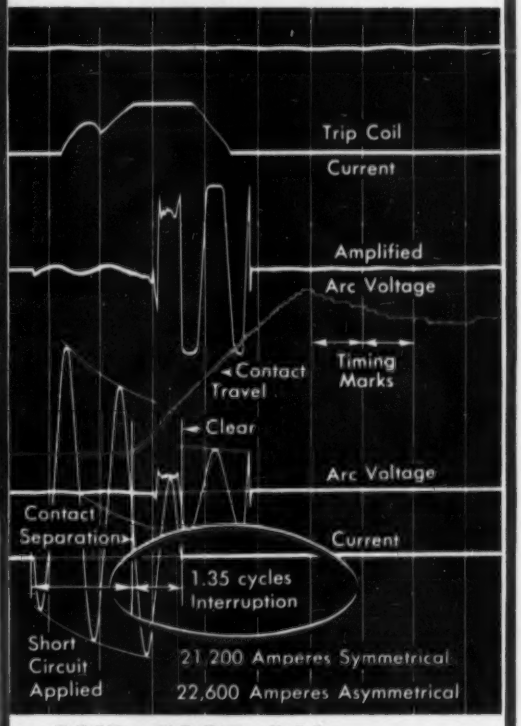


New breaker also has high speed 4-bar mechanism··· "blow-on" contacts ··· and sectionalized arc chute assembly that can be lifted off by one man.

FAST INTERRUPTION AT 500,000 KVA

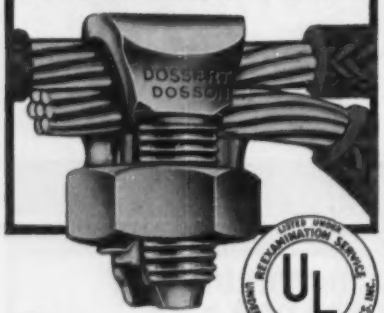


AND FAST ON HIGH CURRENTS TOO!

CHALMERS

AC ALLIS CHALMERS

NEW!
DOSSON "F"
SPLIT BOLT
CONNECTOR



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For:
taps, dead-ends, service entrances, motor leads, junction boxes, ground wire-to-neutral connections

Fabricated from high strength alloys, all component parts of the new Dosson "F" Connector are cold formed, insuring consistent uniformity and high quality. Can be used economically over and over again!

Why It's Your Best Bet:

- high clamping pressure insures tight contact
- maximum tightening force: high translation of tightening torque
- connector alloys possess greater physical properties than average steels
- longer bearing pressure bars avoid conductor crushing, load concentration
- smooth edges can't cut lineman's gloves, nick conductors
- withstands high overload, vibration, corrosion

50 YEARS OF TECHNICAL KNOW-HOW

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SINCE 1904

NWEL&PA

R. G. Setterstrom, Montana Power Co., was elected president of the Northwest Electric Light & Power Assn., for the administrative year just starting, at the 47th Annual Meeting in Portland, July 29. He succeeds A. W. Trimble, vice-president of Pacific Power & Light Co., who has served during the past year.

E. M. Naughton, president of Utah Power & Light Co., was advanced to first vice-president, and Ralph Gale, vice-president of Idaho Power Co., was elected second vice-president. Setterstrom appointed H. C. Donaldson, Montana Power Co., treasurer, and Berkeley Snow, Portland, executive secretary.

Eight members-at-large of the board of directors, representing manufacturers, wholesalers, contractors and dealers, were elected as follows: U. E. Sandelin, Allis-Chalmers Mfg. Co., Portland; William Maxwell-Wood, Schwager-Wood Corp., Portland; A. L. Wiegenstein, Westinghouse Electric Supply Co., Seattle; Paul S. Ouslev, Dan Kamphausen Co., Portland; E. B. DeFeyter, Power City Electric Co., Spokane; Joseph Picatti, Picatti Bros., Yakima, Wash.; George Rankin, Yakima Hardware Co., Yakima; C. C. Musburger, Appliance Mart, Billings, Mont. Other members of the board representing utility companies will be appointed.

Six old-timers of the industry recently retired from their company jobs were elected honorary life members. They are: R. H. Ashworth, vice-president of Utah Power & Light Co., Harry Collins, engineering consultant; J. S. McNair, production consultant, Washington Water Power Co.; Roy Skill, assistant general manager of Pacific Power & Light Co.; A. H. Jaegger, long-time member of the Hotpoint organization in the Northwest; Dave Sallisbury, Westinghouse Electric Supply Co., formerly Seattle.

The first meeting of the new board of directors to lay plans for the year's activities will be called later to meet early in the fall.

Leagues

Alberta now has an Electric Service League with headquarters in Edmonton and is set up to certify adequate wiring under Canada's Red Seal program. Arnold Schwab is manager. Office of the league is at 611 Northern Hardware Bldg.

The first home to be certified had the distinction of having Edmonton's Mayor William Hawdelak make the presentation to Mr. and Mrs. Pinckston. Their home was wired by Brown & Marshall Electric Co.

Trimble Setterstrom

Picatti Musberger Ousley

IAEL

The West's league managers will be represented not only as chairmen of various sessions but on the panel discussion of league activities at the annual conference of the International Association of Electrical Leagues in Philadelphia Sept. 29 to Oct. 2. Last year the conference was held in San Francisco with Ralph B. Hubbard, RMEL, Denver, as its president. Hubbard will preside at the main general session; V. W. Hartley, PCEA and a past president, IAEL, the Thursday general session. LeRoy H. Bennett, manager, Northern California Electrical Bureau, San Francisco, will tell of promoting adequate wiring by TV programs on Friday, Oct. 1. E. A. Cornish, director, research department, NECA, formerly of Oakland, will also appear.

On the panel of league activities, Glen L. Logan, Los Angeles Electric League, will tell of licensing dealers for appliance installations and telephone directory listing simplification. V. W. Hartley, PCEA, will tell of home economist educational programs; and J. Clark Chamberlain, San Diego Bureau of Home Appliances, of cooperation with electrical contractors.

KEEP YOUR POWER LOAD UP
...YOUR OUTAGES DOWN!

String Copperweld TRADE MARK

OVERHEAD GROUND WIRES

—and get PERMANENT PROTECTION for your Transmission Lines

Every year an average of 70,000 strokes of lightning hit power lines in this country, causing 10 times as many transmission outages as any other single factor. As a practical, economical solution to this serious problem, many power systems are using Copperweld* Overhead Ground Wires on their transmission lines to be sure of safe, low-cost and permanent protection against lightning damage.

Copperweld's thick copper covering, inseparably molten welded to the strong steel core of each wire, affords excellent electrical conductivity for relaying and for dissipating lightning discharges. And because this copper covering is rust resistant, the high strength of each wire remains permanent. Thus, with Copperweld Overhead Ground Wires, you can string with small sags to maintain ample mid-span clearances—even under the most severe weather conditions.

Plan now to shield your transmission lines with Copperweld Overhead Ground Wires. You'll find there's no better way to reduce lightning losses, keep upkeep down and be assured of constant uninterrupted service. Write today for your copy of the Copperweld Engineering Data Book—there's no obligation.

*Trade Mark

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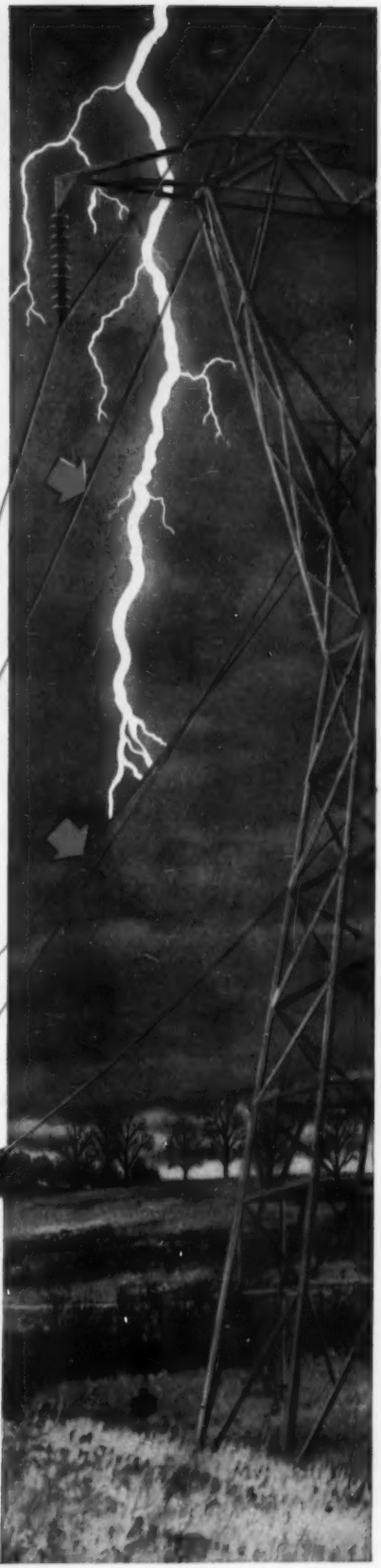
Sales Offices in Principal Cities



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NON-RUSTING

OVERHEAD GROUND WIRES

Last The Life Of The Conductors They Protect!

THE MONTH IN BRIEF

PUD May Ask To Dissolve

Directors of Union County PUD may ask voters to dissolve the organization in a Nov. 2 ballot proposal. Decision to draw up such a resolution followed the Aug. 13 special election at which voters rejected for the second time in less than three months a proposed $4,500,000 PUD revenue bond issue to finance acquisition of California Pacific Utilities Co. properties in the area. In calling the second election, PUD directors contended that opponents had misrepresented the facts and that the company had taken an improper part in the campaign. Total vote exceeded the May turnout and the majority against the bonds was greater in the special election. (Primary election, 2,209 yes and 2,588 no; special election, 2,229 yes and 2,823 no.) The Union County PUD was formed in 1940 and in 1942, at the second election on the proposal, a $925,000 revenue bond issue was authorized by a narrow margin. PUD directors rescinded this original bond authorization and decided to submit the $4,500,000 issue to the voters after the district secured a $3,600,000 condemnation award for California Pacific properties. The district's tax authority has expired and it is out of funds, having spent all of the $109,000 collected in extra tax levies in previous years.

May Ask Joint Permit for Dam

Possibility that the Washington State Power Commission and Grant County PUD may file a joint application for preliminary permit to build Priest Rapids Dam was reported following last month's meeting between the two groups. A PUD suggestion that joint application be extended to include all four possible licensees (EWEST, August, p 108) was not endorsed by the commission.

PP&L, Eugene File Agreement

Pacific Power & Light Co. has agreed to sell to the Eugene Water & Electric Board portions of its distribution system involving 70 miles of line and 2,141 customers. Price is $1,220,260. The board started a suit last winter against Mountain States Power Co., now merged with PP&L. The agreement, filed in circuit court, provides that the company will keep parts of territory originally sought by Eugene and that the city will not invade this territory for 10 years.

Groups Tackle Obstacles

In an attempt to resolve conflicts delaying dam construction, the Pacific Northwest Governors' Power Policy Committee has invited Columbia River fisheries interests to participate in studies being made by its engineering subcommittee. Unless fishery and other problems are resolved there will be a shortage of 900,000 kw in the fall and winter of 1960-61, according to a report of the engineering subcommittee. The report says minimum supply needs in the next 15 years will call for 11,600,000 kw of new capacity. Projects under construction will provide 3,900,000 kw and the 36 hydro developments proposed by agencies and utilities could produce another 8,000,000 by 1969. Construction of these projects is being delayed by various obstacles of which the engineering committee finds fisheries the most extensive. At a Portland meeting on Aug. 18, fisheries representatives selected a nine-member group to meet with the engineering subcommittee in September.

PUC Allows for Tax Increases

California PUC last month authorized rate increases for five utility companies to enable them to offset higher federal income taxes they will pay during 1954. The higher rates will not mean an increase in net revenue, it was pointed out, since all additional charges will be paid out in taxes. Commission authorization of higher rates to meet higher income taxes is in accordance with established rulings of the U. S. Supreme Court, which has said that taxes paid by regulated utilities are a legitimate charge to operational expense. During the time Congress had before it the bill to return the corporate income tax to 52%, the commission staff in rate proceedings made financial computations on both the 47 and 52% tax levels and hearings were not necessary in making adjustments after the law was signed.

New BPA Schedule Filed

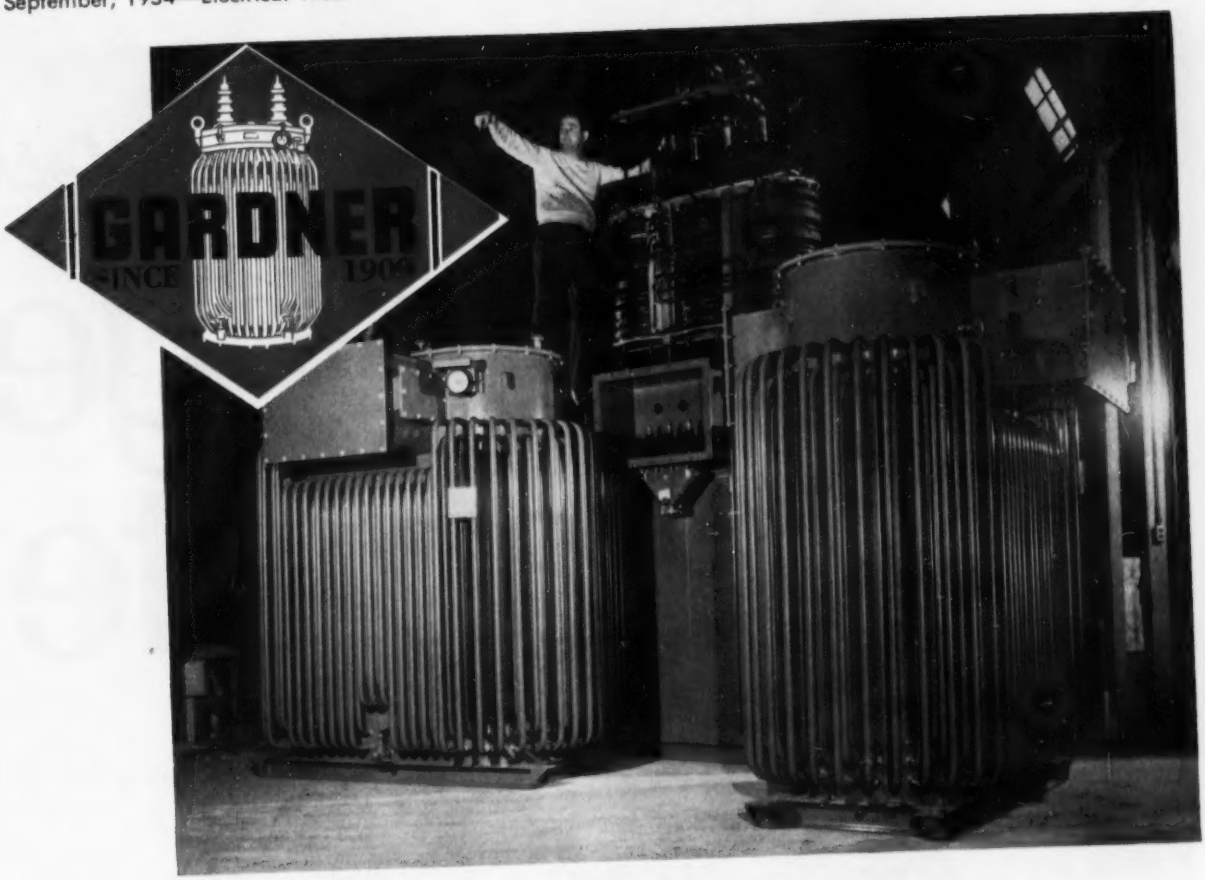
Bonneville Power Administration on Aug. 24 filed a new schedule with FPC providing continuation of present rates through 1956 with privilege of reopening for three years afterward if necessary to repay government charges and interest against power. The new schedule provides simplified billing procedure and a discount system that BPA says will give incentive for irrigation customers to increase electric loads for pumping.

Operation Floodout

Grand Coulee Dam was "hit" by a hydrogen bomb Aug. 23 in a simulated attack conducted by the Washington State civil defense organization. If all the assumptions in the operation had been true, 60% of the state's electric power would have been knocked out and the entire Columbia River area from the dam to the ocean would have been flooded.

Street Lights Up To Voters

Portland voters will decide Nov. 2 whether to tax themselves $1,000,000 a year for 10 years to modernize the city's arterial and residential street lighting. Remodeling was first proposed by the Junior Chamber of Commerce, who took up the project after the National Safety Council reported Portland had only nine miles of adequately lighted streets.



THESE THREE *GARDNER* TRANSFORMERS are shown in our modern factory as they neared completion prior to installation at a large air base. They are three phase, oil cooled, and 6900 volts to 460 volts. This illustration shows the core and coil assembly being lowered into one of the three tanks, and the other two GARDNER transformers completed. Note the terminal chambers provided on both the high voltage and low voltage sides with potheads installed in the high voltage terminal box.

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-Habirprene

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it works where others fail**

The term "RR" is just a name, not an assurance of quality. When you order high voltage RR cable, insist on Phelps Dodge Habirite-Habirprene—developed through years of experience in designing and making high voltage cables. Habirite-Habirprene exceeds the trade's highest standards of quality and reliability.

Phelps Dodge Habirite insulation, a specially engineered butyl rubber compound, has a service dependability record unapproached by any other type of rubber insulation. Habirite is greatly superior to old-fashioned insulations for these reasons:

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- Much greater resistance to ozone—present around high voltage equipment.
- Much greater mechanical toughness affording maximum protection against damage from tools, stones and other installation hazards.
- Better electrical properties—giving a greater safety factor in operation.
- Maximum uniformity of finished product—due to controllable uniformity of raw materials.
- Elimination of laminations which cause weak spots—through use of Phelps Dodge extrusion insulating process.

Phelps Dodge Habirprene sheath, a unique neoprene compound, is especially made to be extra resistant to corona, one of the worst enemies of high voltage cable. This *extra resistance to corona* is an exclusive Phelps Dodge feature. It provides a greater safety factor in operation and has contributed to the remarkable reputation and service record of Habirite-Habirprene.

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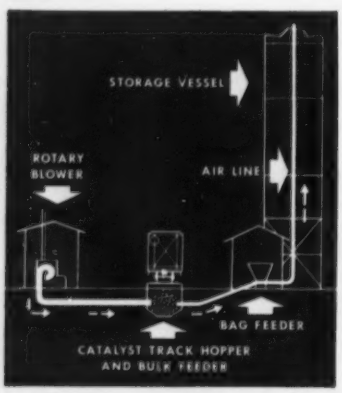
A new electronically-controlled manipulator has been developed by engineers at Argonne National Laboratory to permit scientists to handle "hot" radioactive materials at a distance of several hundred feet or from behind sealed barriers. The new unit, which uses electrical signals, reproduces the same seven basic motions involved in grasping, lifting, moving and turning objects.



Replacing a conventional mechanical batch system of handling catalyst, Kaiser Engineers developed a continuous air stream bulk handling method. Operating costs were reduced by this unique system which moves catalyst at 7½ tons per hour with an attrition loss of less than the 2% maximum guaranteed.

Modern Physics for the Engineer, edited by Louis N. Ridenour, is a collection of lectures given by a group of distinguished physicists and others at the University of California, Los Angeles. The aim of the book is to give engineers a brief account of some of the most interesting developments in this fundamental physical science. Published by McGraw-Hill.

Kaiser Engineers has approximately 600 professional engineers, technical experts and staff ready to tackle your problem in design, engineering or construction. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

THIS MONTH'S NEWS

Army 308 Report Called Obsolescent Document

The army's 308 report for development of the Columbia River basin contains "four basic flaws" and is an "obsolescent document," in the opinion of Col. Fremont S. Tandy, who retired Aug. 1 as district engineer for the Corps of Engineers at Walla Walla.

In a statement he said was issued as a professional engineer, Col. Tandy made these points:

Comprehensive development of the Columbia basin can best be accomplished under present laws with two changes: state governments should be given more voice in the planning of projects, and a national board of engineering review should be established to advise Congress and the President on water resources development.

Controversy over Hells Canyon Dam and FPC hearings on it are not necessary, in the colonel's opinion, because no comprehensive engineering study has been made to determine which are the best Snake River dam sites. Other points Tandy made:

Flood control storage can best be provided as close to the source of floodwaters as possible, specifically on the upper reaches of the Snake and its tributaries—near the snowpacks responsible for the floods.

John Day Dam should be the next project undertaken to keep in logical sequence the development program on the Columbia. This dam is necessary to provide slack water navigation.

Ice Harbor Dam should follow, and if private companies do not undertake the Clearwater Dams (Penny Cliffs and Bruces Eddy) these should be built by the government before going on with the remaining three lower Snake River dams.

In his opinion, Col. Tandy said Army engineers made "a serious mistake" in proposing extensive flood control facilities for the John Day project.

"Flood control envisioned at John Day can be obtained upstream at less cost, and the upstream storage will provide additional power and irrigation benefits. It will also cut the cost of John Day by approximately $100,000,000.

As for the 308 report, Col. Tandy said its "engineering features are basically sound," but the report failed to take into account storage on the Canadian sections of the Columbia River; failed to project any storage of consequence on the Clearwater, "the worst flooding stream in the Snake system"; failed to produce a comprehensive program for developing water resources on the Snake above Weiser, Idaho; and imposes flood control features not necessary on John Day and other proposed dams, concerned primarily with navigation.

Preliminary Permit Issued For Clearwater Projects

A preliminary permit for its proposed development of Bruces Eddy and Penny Cliffs Dams on the Clearwater River in Idaho has been granted to Pacific Northwest Power Co. by FPC.

Combined capacity of the dams would be 536,000 kw. Distribution probably would be through transmission facilities of the Northwest Power Pool to the four controlling companies and then through their separate systems.

Pacific Northwest Power Co. is composed of Montana Power, Pacific Power & Light, Portland General Electric and Washington Water Power companies.

Storage Dam on Columbia Discussed by Companies

Possibility of building a storage dam on the upper Columbia in Canada to provide additional power at downstream dams in the United States was discussed by the Puget Sound Utilities Council at a recent meeting in Seattle. Harold Crosby, chairman of the British Columbia Power Commission, and Garth Griffiths, the commission's distribution superintendent, were present.

The proposed Mica Creek Dam would cost about $350,000,000 and provide 10,500,000 acre-ft of storage, twice that of Grand Coulee Dam. A formula would have to be worked out for division of power, which would be generated by water stored behind the dam during the heavy summer flow and released as needed in the fall and winter.

The council is composed of Seattle and Tacoma municipal systems, Puget Sound Power & Light Co., the Chelan and Snohomish County PUDs.

TRANSFORMER Treasure Hunt

General Electric offers a new transformer for oldest G-E unit in ASA range

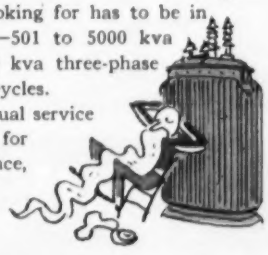
To promote the benefits of standardized transformers and to commemorate the dedication of its new Repetitive Manufacture transformer plant, General Electric plans a unique monument. The Company is sponsoring a "treasure hunt" to find the oldest G-E (or Stanley Electric) transformer in the RM range of ratings that was still in operation on May 11, 1954, the day the plant was dedicated. The prize, in exchange for the oldest unit, will be a new G-E self-cooled, oil-insulated transformer of equivalent rating delivered free of charge.

BONUS PRIZE FOR REPLACEMENT BY RM UNIT

If the winning transformer can be replaced with an RM unit having kva and voltage ratings and impedance values which are listed in the ASA standard, there will be an extra bonus in the form of an all-expenses paid trip to G.E.'s new Rome, Ga., plant for a man in the winner's organization.

WHAT TRANSFORMER WILL QUALIFY?

The transformer G.E. is looking for has to be in the ASA range of ratings—501 to 5000 kva single-phase, 501 to 10,000 kva three-phase 69,000 volts and below, 60 cycles. It must have been in continual service as of May 11, 1954—except for normal periods of maintenance, spare duty or relocation.



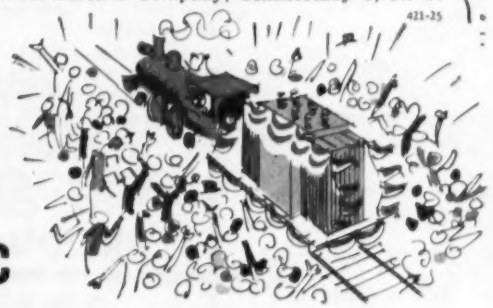
WHO CAN PARTICIPATE?

All electric utilities, manufacturing, and transportation companies are invited to take part in this nationwide transformer "treasure hunt."

HOW TO ENTER THE "TREASURE HUNT"

It's easy to enter the treasure hunt. It's fun. And it may be profitable. But, do it right away. Your entry must be post-marked not later than November 1, 1954. If you have a transformer "old timer" still in operation, why not ask your G-E Apparatus Sales Representative for a "treasure hunt" entry blank. Or write for Entry Form GEZ-1046. General Electric Company, Schenectady 5, N. Y.

421-25



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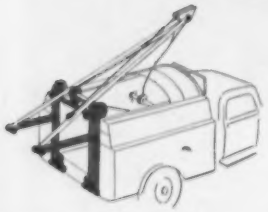
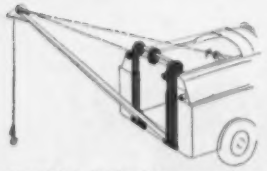


Derrick raised by simply engaging the winch.

Vertical position—winch rotation reversed.



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The patented Storage Kit fits any standard utility truck body and "A" frame derrick and it can be quickly bolted on the back of your truck by your local mechanic. The derrick will go up or down in a minute or less, entirely controlled by the man in the truck cab. Working with a double drum winch, you get live boom operation—or easily adjustable derrick elevation with a single drum winch.

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B. C. GOVERNMENT APPROVES PROJECT

British Columbia government approval of Northwest Power Industries' application to construct a $700,000,000 hydroelectric and metallurgical development in the province's Atlin Lake region was announced Aug. 2.

Minister of Lands and Forests Robert Sommers stated that the power company, a subsidiary of Ventures Ltd., had agreed to government requirements—principally by posting a performance bond "running into millions of dollars"—and was prepared to start construction at an early date.

The bond, Sommers said, "will be subject to annual review and will be forfeited in the event that the company fails in any respect to live up to the terms of the agreement."

The first step in the development will provide some 90,000 kw by 1957, leading to the first major objective of 660,000 kw by 1962. Investment of some $270,000,000 is planned for this eight-year period.

Surveys indicate an ultimate potential of about 3,200,000 kw can be developed in the area.

Sommers noted that the agreement was reached within the bounds of existing legislation, that the company will receive no special concessions in taxes, it will be required to clear areas to be flooded, and it will pay full rates for the water it uses.

Although negotiations have been finalized with Northwest Power Industries Ltd., other interests are participating in the over-all plan, including Frobishers Ltd., Quebec Metallurgical Industries Ltd., Falconbridge Nickel and Reynolds Aluminum Co., Ltd.

Seattle Okays Plans for Proposed Skagit High Dam

Plans for the proposed high dam at Gorge Creek on the Skagit River have been approved by City of Seattle. Cost is estimated at between $17,000,000 and $18,000,000, including construction of a new vehicular roadway between Devil's Elbow and Diablo.

The new dam will be a combination gravity and arch structure, 280 ft high and 670 ft long. It will replace the present low diversion dam that diverts water from the Skagit into the two-mile tunnel to the Gorge power house.

Output of the Gorge power plant, now about 100,000 kw, will be increased by 50,000 kw by the higher dam. No additional generators will be required but production from the four existing units will be increased.

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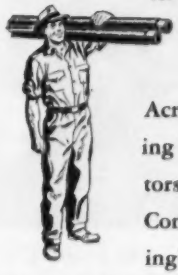

Across the country in every city and state, leading Utilities, Municipalities, Electrical Contractors everywhere have made Orangeburg Fibre Conduit a leader, as its wide use convincingly shows.

You gain many advantages when you use Orangeburg. Its impermeable wall and tight joints prevent corrosive ground waters from entering. Its smooth bore and low coefficient of friction safeguard the cables when pulled in . . . also from wear during cable movement. Non-metallic Orangeburg does not corrode — resists acids, alkalies, grease, oil. It is tough, resilient, durable — will not crack or break when properly handled. And the installation cost is low because the lightweight 8-foot lengths are quickly connected by Taper-Sleeve Joints with just a few light taps. Orangeburg is easily sawed to any length — easily tooled with an inexpensive lathe.

For these and other reasons, Orangeburg is logically the leader — a first choice of so many public utilities, municipalities and electrical contractors everywhere.

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GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

Installation of generators at McNary Dam is progressing according to schedule. Here is shown under construction the fifth unit, due in September, of the ultimate fourteen 70,000-kw units. Schedule calls for units at three-month intervals until the plant is completed. Contractor is the Cascade Constructors, a joint venture of Morgan Electric Co., P. S. Lord Mechanical Contractors and Wismer & Becker Electrical Contracting Engineers

Chelan County PUD Given Preliminary Permit

Chelan County PUD has been granted a 36-month preliminary permit by FPC for a hydro development on the Columbia in Chelan and Douglas Counties, Wash. The plan is essentially the same as that for the Rocky Reach project proposed by the Corps of Engineers in October 1948. It contemplates an initial power house installation of nine units, each turbine rated at 106,000 hp and direct-connected to a generator rated at 65,000 kw at 83 ft gross head. Ultimate installation would be 14 units.

REA Co-op Plant Put Into Service in New Mexico

Plains Electric Generation and Transmission Cooperative—one of the Rural Electrification Administration's largest co-ops in the West—was dedicated and put into service at Algodones, 22 miles north of Albuquerque, last month.

Built at a cost of $5,800,000, the 30,000-kw plant will furnish power to 12 rural electric co-ops extending from Columbus, N. M., near the Mexican border, to Monte Vista, Colo. Transmission lines will bring the total cost to $10,000,000.

The plant uses natural gas in its steam generators and also has a $150,000 stand-by oil system.

While the nameplate rating of the two generators is 15,000 kw each, they can be stepped up to 17,500 kw each.

Three substations and 183 miles of transmission lines have already been completed to feed the power into northern New Mexico and southwestern Colorado.

• **Contract** for construction of a 47-mile section of Bonneville Power Administration's 345-kv Chief Joseph to Snohomish transmission line has been let to Bay Construction Co. Inc. and Don L. Cooney Inc., Seattle, on bid of $533,967. The award completes contracting for the line and the section will run from the switchyard at the Chief Joseph Dam to a point near Farris, Wash. Completion is set for a year.

• **A $100,000,000, 20-year contract** expected to bring natural gas to Seattle by the end of 1955 has been signed by the Seattle Gas Co. with Pacific Northwest Pipeline Corp., which has an FPC permit to pipe the gas from the San Juan Basin of New Mexico. N. Henry Gellert, president of Seattle Gas, predicted that "the day will surely come in the Pacific Northwest when hydroelectric power will be supplemented by gas-generated electric power."

POWER COMPANY TO BUILD SERVICE HEADQUARTERS

Portland General Electric Co. will start construction on a four-phase $1,100,000 service center, which will expand facilities while at the same time utilizing its present service quarters in Portland. Planning, directed by Architect Glenn Stanton, incorporates an existing warehouse.

An office-type structure, 80x220 ft, will be erected to house the distribution line and repair departments. This building will be a one-story and basement, steel and concrete frame with brick exterior and aluminum windows and trim. Plans call for a multipurpose room with stage and adjacent cafeteria for use of public as well as company. Design incorporates strength sufficient to support four additional stories as required.

The second unit calls for alterations and additions to the existing brick-faced warehouse-type building, which is about 30 years old. Adjacent to this structure will be erected a 92,000-sq-ft building for a transformer shop, to provide repair and service for all PGE divisions. The building will be of structural steel and reinforced concrete with precast concrete roof decks.

Snohomish Dam Project Approved by Tacoma

Tacoma Public Utilities Board has approved construction of the $22,500,000 Snohomish Dam project, and set wheels in motion for beginning the $146,000,000 Cowlitz development.

The board directed its utilities director, Dean Barline, to draw up resolutions calling for construction and bond issue for the Cowlitz, which it is estimated will bring in 345,000 kw at full generating capacity.

The city council must pass on the Snohomish installation and the two dams on the Cowlitz at Mossyrock and Mayfield, but little opposition is expected.

Construction of Snohomish Dam will take more than two years. The board has not decided whether the Cowlitz will be constructed one dam at a time, or both at once. Federal aid will be sought for Mossyrock construction on the basis of flood control help.

• **Montana Power** Co. has filed applications with FPC for two proposed hydro developments on the Flathead River. One would be located about 10 miles southwest of Polson in Lake County; the other 19 miles south of Polson. Both plants would have installed capacity of approximately 120,000 kw.

TOPS IN BOTTOMS

Distribution transformers are subject to weather and handling hazards both on the line and in storage. Constant exposure to abuse from man and weather makes protection difficult. Transformers are particularly vulnerable at the base, where moisture from condensation or rain will cause rust that attacks any unprotected point.

Moloney HiperCore Transformers are *tops in bottoms.* Their rugged shells are designed to stay in use despite weather and abuse. Moloney HiperCore Transformer Tanks are protected against rust forming at the base weld... and feature a rolled lip which prevents deterioration from weather or water. The tank base is first pressed into the shell and is bonded into a unit by a continuous seam weld. The inside edge, the only point where water might stand, is coated with a sealing mastic and rolled in, forming a lasting barrier against moisture, air, and the ravages of rust.

So, give your distribution system the advanced engineering, design, and fabrication that is synonymous with Moloney Products *all along the line.*

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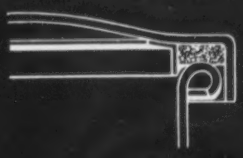
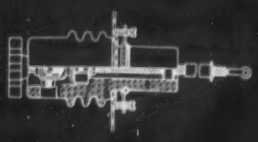
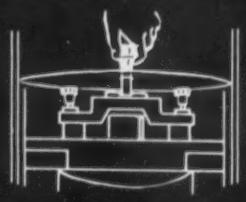


Cyprene gasket retained by ring welded to tank cover. Gasket is retained in position forming a perfect tank seal. Gasket is not cemented and can be used again and again.



Moloney sidewall mounted high voltage bushings are provided with a molded, high impact resistant phenolic-cold rubber protective cap for working "hot".



Tap changer operating handle located above hot oil level. Double-moving contacts snap into position with a wiping action that assures positive contact.

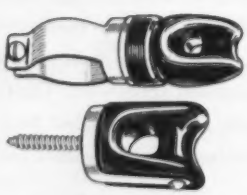
Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations Network Transformers • Constant Current Transformers • Capacitors • Transformers for Electronics

MOLONEY ELECTRIC COMPANY

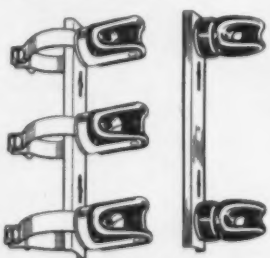
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

"COMPLETE LINE"
SECONDARY SERVICE MATERIALS

Wireholders, secondary racks, house brackets, clevises and spools that are tops in design and performance. Double hot-dip galvanized for longer service. Sharp, clean, quick driving wireholder screws. Dense, homogenous porcelain for top strength, highest insulation value. Quick installation — long service — that's Porcelain Products' secondary service materials! See your nearest jobber, or write us for complete details.


WIREHOLDERS
Standard and pipe-mounting

SECONDARY RACKS
Solidly constructed for longer service


HOUSE BRACKETS
Standard and pipe-mounting

FOUR-IN-ONE SPOOLS
A wonderful new product

SPOOLS

CLEVISES
For every application

60 years Porcelain Products, Inc. PP INC
FINDLAY, OHIO

OCEAN WATER DISTILLATION PLANNED FOR STEAM PLANT

Pacific Gas and Electric Co. plans to install sea water evaporators to produce fresh water for boiler operations in its $44,000,000 steam-electric generating plant under construction at Morro Bay, Calif.

Company officials believe it will be the first industrial application of ocean water distillation anywhere in the nation.

Designed by PG and E engineers and Bechtel Corp., contractor for the plant, each set of evaporators will have a fresh water production capacity of 50 gpm or 72,000 gpd. One set of evaporators will be installed on each of the two boilers.

According to Norman R. Sutherland, vice-president and general manager, the decision to design salt water evaporators was reached after exhaustive studies into the fresh water supply in the area. For auxiliary use, there will be two wells on the property.

Production of the evaporators can be controlled, and only enough fresh water will be made to satisfy plant needs. To produce 50 gal of fresh water, about 150 gal of sea water will be processed.

The first of Morro Bay's two 150,000-kw units will go into service next year, with the second scheduled for operation in 1956.

Power Interchange Contract Signed by City, USBR

Fort Collins, Colo., city council has approved a 20-year contract with the Bureau of Reclamation for mutual exchange of power between the bureau's Colorado-Wyoming power system and the city's 10,000-kw steam plant.

The exchange was to go into effect September 1 on completion of an $85,000 transmission line from the Fort Collins plant to the bureau's Poudre substation, a mile north of the city. City officials said a 5% discount to the municipal government on power purchased from the bureau is expected to amortize the cost of the line in 17 years.

The contract was under negotiation for more than eight years.

• **San Isabel Electric** Assn. Inc., REA, cancelled subscriptions of its 1,200 members to the Colorado Rural Electric News after charging that the paper "is constantly in the position of being against private utilities and the profit system." The News is published by the Colorado Assn. of Rural Electric Cooperatives.

Get higher conductivity

PLUS PERMANENT TIGHTNESS WITH MATTHEWS SPLIT-BOLT* CONNECTORS

Matthews Split-Bolt Connectors, forged from medium drawn copper, have the same characteristics as the conductor itself. That's why you get high conductivity that reduces line heating, conductor damage, radio and TV interference, and the damaging effect of overloads.

You can screw these split-bolts up tight enough to stay tight without smashing the conductor in a vise-like grip. Torque wrench tests prove that connections made with Matthews Split-Bolts *stay tight* over longer periods of time because both clamp and conductor have the same coefficient of expansion.

*formerly Nutype

Pad swings clear while installing clamp on conductor.

For larger conductors...

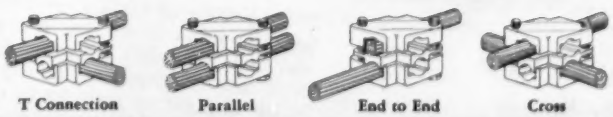
USE THE EASY-TO-APPLY...LOW COST MATTHEWS UNICLAMP

For 1/0 through 1,000 MCM conductor you can save money and get a better, more easily applied connection with Matthews Uniclamps. They cost less than split-bolts in these larger sizes, and they give you a wider contact area plus the extra strength needed on large stranded conductors. Linemen like Uniclamps because they can be installed without taking them apart, and their shape makes them easy to cover with protective tape.

Three sizes are all you need

WHEN YOU USE MATTHEWS MULTITAPS

Substation connections, grounding grids or industrial wiring jobs that call for a wide variety of taps can usually be handled with Matthews Multitaps. These versatile connectors can be used for cross, T, end to end, and parallel connections. The three sizes will accommodate a wire range from #1 stranded up to 1000 MCM on the main line side, and #6 solid to 1000 MCM stranded on the tap side. Multitaps are cast of high strength copper alloy. They have rounded corners for easy taping.



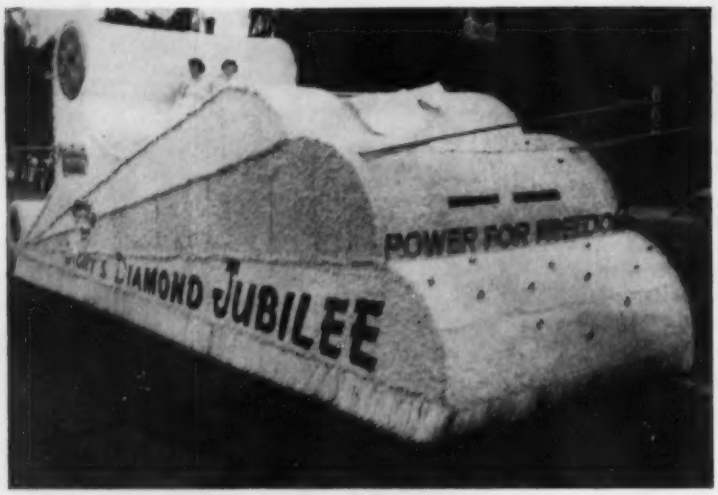
T Connection | Parallel | End to End | Cross

ABC INDUSTRIES

A·B·CHANCE CO.

CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

CC54-13



With this traveling float, Montana Power Co. is telling the story of Light's Diamond Jubilee throughout its system. Mounted on the rear of the float is a working model of Kerr Dam, which when desired can be dismounted and shown as a stationary display. Dam and float were designed by H. A. Scovil and R. R. Engstrom of the advertising staff, with John Cromer, engineering, as advisor

Farm Utilization Meetings Scheduled by Council

Five area meetings to encourage development of state programs to increase use of electric power on the farm are being sponsored by the Inter-Industry Farm Electric Utilization Council. The council is made up of representatives of cooperatives, power companies and the NEMA.

The Western states, with the exception of New Mexico and Arizona, are included in the Western Area, which will meet Sept. 28 in the Shirley-Savoy Hotel at Denver. Arizona and New Mexico are in the Southwest Area, which meets Oct. 15 in the Texas Hotel at Fort Worth.

Over-all program for the meetings: (1) to establish the facts on the rural market for electric appliances and equipment; (2) to present the reasons for the effectiveness of electric sales programs conducted on the state level.

Persons wishing to attend the meetings are requested to write the council's chairman, Fred H. Strong, deputy administrator, Rural Electrification Administration, Washington 25, D. C.

Reorganization Brings Termination Notices

Employment termination notices were issued to 199 Bonneville Power Administration workers last month in reorganization of personnel and department functions as recommended by a special administrative survey team which directed cutback of staff to total 2,100 by next June. Personnel affected by the 30-day notices include 129 in the Portland-Vancouver headquarters area and 70 in field offices.

Bonneville's announcement, which added that about half the positions being abolished are filled with temporary employees, noted that a shift of agency construction policy—less force work and more by private contractor—will make it possible to carry out the reduction without curtailing any essential transmission agency services.

Hawaiian Electric Asks Rate Increase of 11%

Application for an estimated general rate increase of 11% was filed by Hawaiian Electric Co. As in the case of its 1952 rate increase application—first in more than 30 years—the new schedules are necessary to keep pace with rise in operating costs and to carry on with its extensive expansion program, the company explained.

If the increase is granted by the Territorial Public Utilities Commission, it will be put into effect in January 1955. First hearing has been set for Nov. 8.

• **University of California** Engineering Extension is offering courses for electrical engineers, beginning in mid-September. Classes may be organized in an in-plant or contract basis and for interested public groups anywhere in California. Information may be secured from extension offices at Berkeley, Oakland and San Francisco. New courses this year are: industrial power systems; illumination and lighting design; industrial electronics, fundamentals of TV, review of electrical engineering.

State Commission Grants Edison Increased Rates

California's Public Utilities Commission authorized an electric rate increase for Southern California Edison Co. Effective Sept. 13, the new schedules will produce an estimated $9,800,000 annually in additional gross revenue for a 5.9% rate of return. The increases are first in electric rates for the company in 33 years.

The company had asked an annual increase in revenue of $18,600,000 for a 6.29% rate of return.

The PUC also ordered a complete revision of the company's zoning system which will materially change the rate schedules applying to most cities and areas served.

Largest increases will be made in agricultural and pumping and large industry schedules. Out of the $9,800,000 additional revenue the company will pay taxes amounting to $5,300,000. The commission had announced in another decision the same day that "it is a rule established by the Supreme Court of the United States that income taxes, both state and federal, are a proper charge to operating expense."

• **City of Centralia, Wash.,** has awarded a $692,568 contract to the Seattle firm of Scheumann & Johnson for constructing Unit No. 6 of its hydroelectric project on the Nisqually River. Main items in the contract include construction of fish screens and radial gates with hydraulic hoist at the headworks. Also included are revisions of a nine-mile canal, revisions to the spillways and reconstruction of 11 bridges across the canal.

Left: Victor uses seasoned cast-iron jigs for greatest accuracy.
Above: Victor Apparatus Insulators assembled in precision-aligned jigs.

Another Reason Why

VICTOR Makes Better Insulators

WE USE ACCURATE JIG ASSEMBLY METHODS

APPARATUS INSULATORS require accurate assembly of porcelain and metal parts to achieve perfect alignment and accuracy of installation on the job.

One of many reasons why Victor apparatus insulators have such enviable service records is Victor's use of precision-built cast-iron jigs. Here, every insulator is clamped in position to assure accurate alignment. Before shipping, each unit is thoroughly tested mechanically and electrically in accordance with NEMA specifications.

Buy Victor and you're sure of correctly designed, painstakingly manufactured and thoroughly tested insulators of *Purified* Porcelain—finest insulator porcelain ever made!

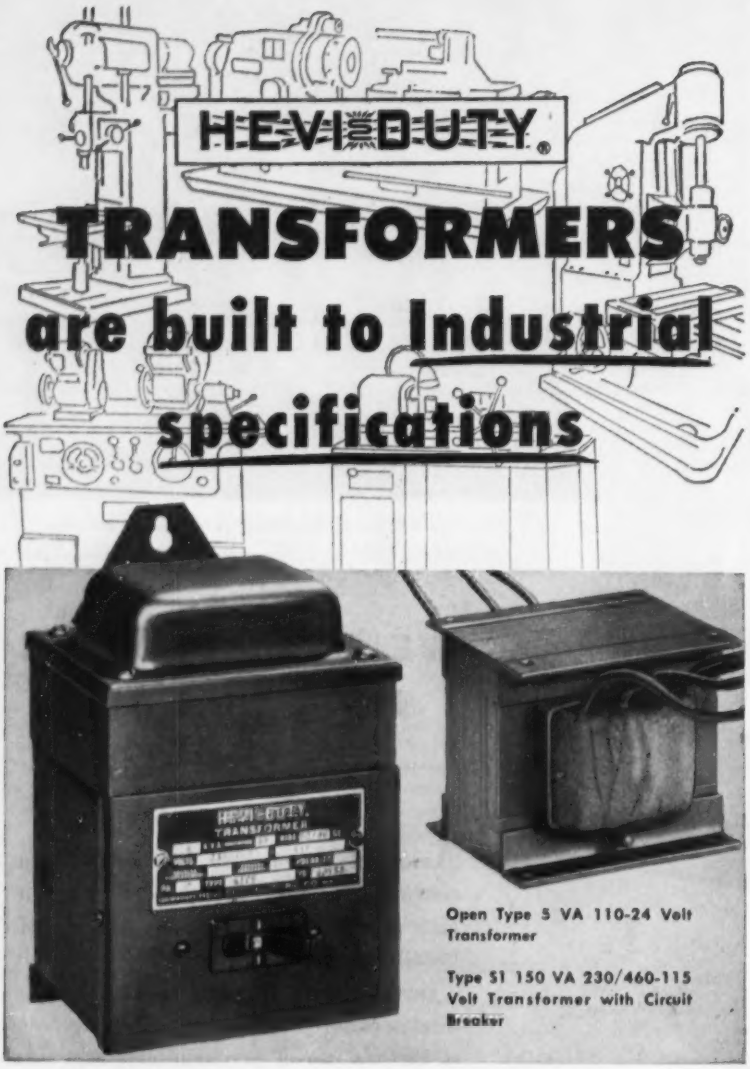
VICTOR
NO. 729
STACKING UNIT
(TR NO. 140)

Specify

VICTOR PURIFIED PORCELAIN INSULATORS!

VICTOR INSULATORS, INC., VICTOR, N. Y.
SUBSIDIARY OF I-T-E CIRCUIT BREAKER CO.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain


HEVI DUTY
TRANSFORMERS
are built to Industrial
specifications
Open Type 5 VA 110-24 Volt Transformer
Type S1 150 VA 230/460-115 Volt Transformer with Circuit Breaker

You can now buy small specialty transformers for industrial control built to the same high standards that have chacterized larger HEVI DUTY transformers for many years. They are . . .

★ Designed for HEVI DUTY service.

★ Vacuum pressure impregnated with moisture and corrosion resistant varnish for HEVI DUTY use.

★ Completely tested for HEVI DUTY applications.

Sizes 5 VA and larger are available
Write for complete details

HEVI DUTY ELECTRIC COMPANY
MILWAUKEE 1, WISCONSIN
Heat Treating Furnaces... Electric Exclusively
Dry Type Transformers *Constant Current Regulators*
West Coast Plant — 10526 Oxnard Street — Van Nuys, California

ADVISORY COMMITTEE ON WEATHER CONTROL NAMED

Offices of the Advisory Committee on Weather Control were recently opened in the General Services Administration Bldg., Washington, D. C.

The advisory committee was appointed last winter by President Eisenhower as a result of the passage of Public Law 256 of the 83rd Congress. The committee was empowered to make a complete study and evaluation of public and private experiments in weather control for the purpose of determining the extent to which the United States should experiment with, engage in, or regulate activities designed to control weather conditions. It is required to report to the President at the earliest possible moment on the advisability of the federal government regulating by means of licenses or otherwise those who attempt to engage in activities designed to modify or control the weather. Its final report is scheduled to be made to Congress not later than June 1956.

The advisory committee consists of 11 members, including the Secretaries of Defense, Agriculture, Commerce, Interior and Public Health and Welfare, or their designees, the director of the National Science Foundation and five members appointed from private life of outstanding ability in the fields of science, agriculture and business.

Task forces from the committee have already inspected several commercial and research cloud-seeding projects and are reviewing the work accomplished in numerous rain-making projects throughout the U. S. and in foreign countries. Later the committee will hold hearings in various parts of the country to give interested persons the opportunity to express their views.

Company Grants Pay Boost, Protests Certification

British Columbia Electric Co. will pay its 250 gas employees in Vancouver and Victoria, B. C., the new rates asked by their bargaining agents, International Brotherhood of Electrical Workers, but it refuses to sign the two-year agreement.

BCE objection to the certification of the IBEW as bargaining authority for the gas workers centers around its contention that one union should not have full power over workers in another group. The company has filed an application in Supreme Court asking the Labor Relations Board to explain its certification of the electrical workers union as agent for the gas workers.

No. 8 IN A SERIES

a Sub-Station Engineer ASKS—

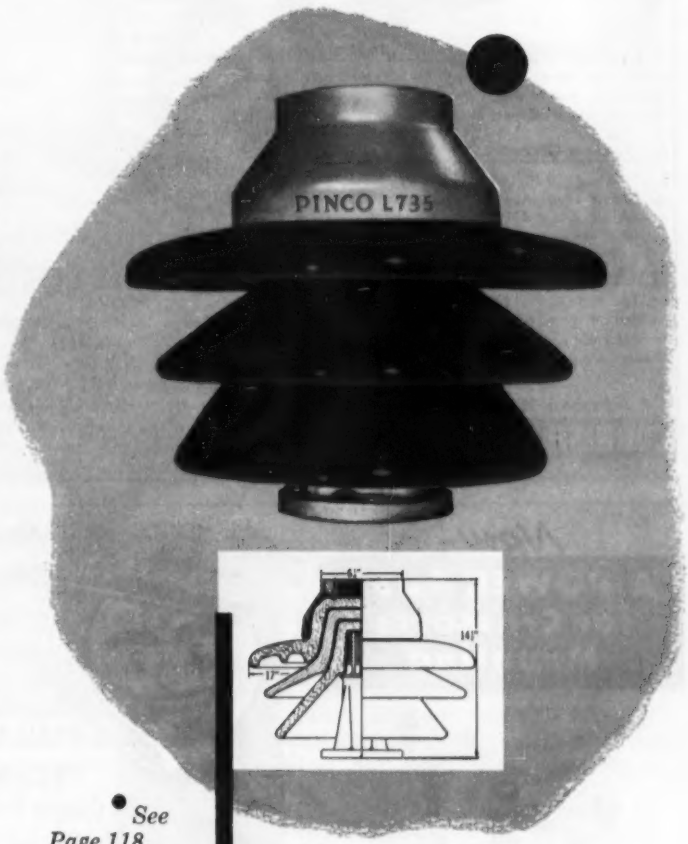
"what are the advantages of a larger second shell on the PINCO 735 switch and bus unit?"

here's the answer...

Prior to the introduction by Pinco of this improved, larger second shell design, all switch and bus units were susceptible to cascading in stacks, which of course was not desirable. Today, however, the Pinco 735 Switch and Bus Stacking Unit, with its larger second shell, improved center design and more rugged porcelain, shows far superior flashover performance and eliminates cascading. In addition, it also provides extra leakage protection and increased mechanical strength.

another PINCO "FIRST"

The design characteristics shown in the Pinco 735 have proven their superiority by *"right on the job"* performance in years of widely varied service in all voltages. The abilities and facilities responsible for this and other outstanding examples of Pinco pioneering leadership in insulator and special porcelain design and manufacture, are at your service. We invite you to—PUT IT UP TO PINCO!



• *See Page 118, Pinco Catalog No. 49 for complete electrical and mechanical specifications*

PINCO 735 SPECIFICATIONS

Dry Flashover	160,000 volts
Wet Flashover	95,000 volts
Leakage Distance	33"
Torsion Strength in lbs.	40,000
Tension Strength, lbs.	20,000

PINCO INSULATORS

RIGHT ON THE JOB—

The Porcelain Insulator Corporation
LIMA, NEW YORK

If you don't have a copy of the Pinco Catalog, write us or contact the Joslyn Pacific Co. office in your locality.

BE Sure with CORNISH

replacement cord sets

electric dryer cord sets

for Lamps, Radios, Small Appliances

6-, 8- and 10-ft., 18/2 type SP-1 brown cord, with molded-on plastic plug. Appliance end stripped ¾". Hanked, with UL Green Cord Set label applied.

for Vacuum Cleaners, Small Tools, Mixers, etc.

6-, 10- and 20-ft., 18/2 type SV black cord, with molded-on plug. Appliance end jacket removed 2"; conductors stripped 1". Hanked, with UL Green Cord Set label applied.

for Trouble Lights, Small Motors, Tools, etc.

6-, 10- and 20-ft., 18/2 16/30 SJ black cord with molded-on plug at one end. Appliance end jacket removed 2"; conductors stripped 1" Hanked, with UL Green Cord Set label applied.

Support your local Adequate Wiring Bureau program

Series #5533, utilizing a new molded-on three pole angle rubber plug equipped with "L" shaped grounding blades. Used primarily for application to 10/3 S cord or type SR range cable. Rated at 30 amperes 250 volts, approved by Underwriters' Laboratories. Individually packaged in a carton that serves as a shipping container.

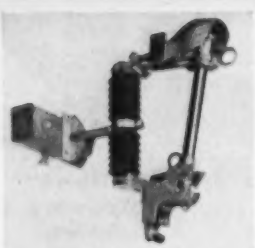
electric range cord sets

3-, 4-, 5- and 6-ft., type SR rubber covered range cable. Two #6 and one #8 conductors for 50 amp., or two #8 and one #10 conductors for 35 amp. service. CORNISH #500 molded-on plug vulcanized to cable for long-time water-repellent security. Equipped with suitable terminals and metal strain relief. Each cord individually boxed.

CORNISH WIRE COMPANY, INC.
50 Church Street New York 7, N. Y.

Now-

A POWER FUSE for Crossarm Mounting



MOUNTED on a single insulator, S&C's Type HSO Power Fuse affords economical protection on distribution systems where fault currents exceed the safe interrupting capacities of cutouts.

Lower installation cost makes this style fuse ideally suited for sectionalizing points, and for protecting distribution transformers.

Type HSO Power Fuse is also available in single-, two-, and three-shot styles with NEMA insulators, in ratings through 34.5 kv.

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420 MARKET ST., SAN FRANCISCO 11, CAL.
PHONE SU. 1-7352

Manufacturers Representative For:
SUPREME ALKCO
WILSON B-LINE
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PANAMA PRESENTS Quality Products for Better Lighting

SUPREME
Fluorescent Fixtures
Commercial — Industrial — Residential
Planned Lighting
Designed for specifications of "particular" projects.
Inquire from your local distributor or write to . . .

PANAMA LAMP & COMMERCIAL CO., INC.
for better lighting — it's PANAMA

325 Ninth Street, San Francisco 3, Calif.
Phone: MArket 1-3251

57 years of LIGHTING Service

NOTES ON THE TRADE

Gardner Stock Purchased By Federal Pacific

Purchase of Gardner Electric Mfg. Co. of Emeryville, Calif., by Federal Pacific Electric Co. of Newark, N. J., was completed Aug. 17.

Gardner will continue to operate under its own name as a subsidiary of Federal Pacific. Gardner officers will be A. A. Browne, president; David G. Taylor, executive vice-president; Edward P. Mazzola, vice-president in charge of engineering and production; Lester R. Flint, treasurer.

Gardner transformers will be sold by the Federal Pacific sales organization. This includes members of the former Pacific Electric Mfg. Corp. of San Francisco, which was purchased by Federal in May 1953 and recently was merged with the parent firm under the name Federal Pacific Electric Co.

Kuhlman Transformers Now Distributed by M&H

Kuhlman transformers will be distributed in the Pacific states and Alaska and Hawaii by Maydwell & Hartzell Inc., effective Sept. 1. This announcement was made simultaneously last month by Joel H. Watkins, sales manager, Kuhlman Electric Co., and Harry F. Hartzell, president, Maydwell & Hartzell.

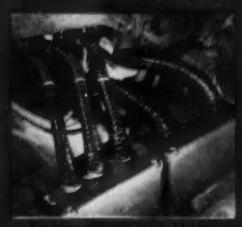
West Coast representation for Kuhlman through the five M&H offices and warehouses in San Francisco, Los Angeles, Phoenix, Portland and Seattle will cover the states of California, Arizona, Oregon, Washington, Idaho, most of Nevada and the northwestern portion of Montana in addition to Hawaii and Alaska.

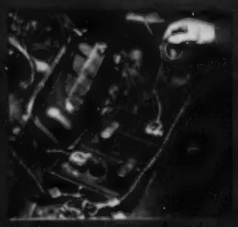
Kuhlman transformers replace Gardner in the line of equipment and apparatus sold by M&H to utilities, industrial organizations and jobbers.

• **Westinghouse** has opened a new Pacific Coast regional office for executives of its Appliance and Television-Radio Divisions and WESCO. Located in expanded quarters in the Western Merchandise Mart, the new headquarters consolidate consumer product sales and service headquarters formerly located in the Mart and in Los Angeles. It has 6,500 sq ft of floor space; contains 13 executive offices, conference room and display area.

For extra service quality . . .

DUTCH BRAND *plastic* ELECTRICAL TAPES





For Safer and Neater Insulated Wire Splices Use Dutch Brand Tape

Dutch Brand . . . Perfect for Taping Electrical Bus Bars

Taping Tool Handles Provides Better Grip and Protection

Neat Splicing for Limited Space

The complete line . . .
that meets every industrial need

.007″ is the standard electrician's favorite for general use. **.010″** for heavy duty work and for use with power driven taping machines. **.020″** . . . unexcelled for extra heavy duty work, and resistance to abrasion. Color: **DUTCH BRAND Vinyl COLOR TAPE** in 8 colors and four widths, perfect for color coding, indexing, and electrical insulation. Use the *complete* DUTCH BRAND line!

PROPERTIES AND CHARACTERISTICS

	.007	.010	.020	COLOR
DIELECTRIC STRENGTH	1000 V/MIL	1000 V/MIL	900 V/MIL	1000 V/MIL
TENSILE STRENGTH	20 LBS./INCH OF WIDTH	30 LBS./INCH OF WIDTH	40 LBS./INCH OF WIDTH	15 LBS./INCH OF WIDTH
ADHESION TO POLISHED SURFACE	30 OZ./INCH OF WIDTH	30 OZ./INCH OF WIDTH	20-30 OZ./INCH OF WIDTH	28 OZ./INCH OF WIDTH
ELECTROLYTIC CORROSION	1.0 MIN.	1.0 MIN.	1.0 MIN.	1.0 MIN.
RESISTANCE TO OIL & GREASE	GOOD	GOOD	GOOD	GOOD
ABRASION RESISTANCE	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
RESISTANCE TO ACIDS & ALKALIS	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT

JOHNS-MANVILLE DUTCH BRAND VAN CLEEF DIVISION

Johns-Manville
DUTCH BRAND
PRODUCTS

VAN CLEEF BROS., INC. DIVISION
7800 WOODLAWN AVENUE CHICAGO 19, ILL.

• **Andrew L. Polich,** formerly a member of the General Electric Supply Corp. sales force in the Portland area, has established A. L. Polich & Associates, a new firm of manufacturers' representatives serving Oregon and southern Washington. Address is 5860 S.W. 18th Drive, Portland, 19. Included among the lines that the Polich organization will represent are Clark Controller Co., Cleveland; Panellit Inc., Panalarm Inc., and Panascan Inc., all of Chicago; Agastat Division of Elastic Stop Nut Corp., Elizabeth, N. J.; and De-Tec-Tronic Inc., Chicago. The firm will call on utilities, industrials, wholesalers, consulting engineers and architects.

• **California Electric Service** Inc. announced the appointment of **B. F. Belknap** as the branch manager for the San Francisco operation, effective Aug. 2. He was formerly at H. R. Basford Co., appliance distributor in San Francisco. In Los Angeles, **James L. Kidd,** formerly midwest regional service manager for Landers, Frary & Clark, makers of Universal appliances, St. Louis, became manager of the Los Angeles branch. **Keith L. Chamblin** is vice-president in charge of the appliance service stations.

• **The nation's highest industrial safety award was** won by the Pittsburg, Calif., Works of U. S. Steel's Columbia-Geneva Steel Division. The National Safety Council presented its Award of Honor to the plant's 4,000 employees at a luncheon meeting on Sept. 2. The plant record was 4,582,701 man-hours of work without a lost-time injury from Sept. 15, 1953, to April 11, 1954. This is the fifth award the Pittsburg Works has received from the National Safety Council. Tom Burke, NSC's assistant director of the Western region, made the presentation, which was accepted by D. E. Rice, general superintendent.

• **Westinghouse Electric** Corp. will transfer its Lamp Division warehouse facilities from San Francisco to larger quarters in the East Bay area. Some 40,000 sq ft of space in a Westinghouse building at Emeryville will be converted into a lamp warehouse to serve territory as far east as Salt Lake City. Operations from the new warehouse are to begin early this fall.

• **Westinghouse Electric Supply** Co. has opened a new branch in Billings, Mont., at 302 N. 15th St., with **Frank Chesark,** formerly manager at Butte, as manager.

• **Dan H. Radke** has announced the termination of his association with the Ruby Lighting Corp. as of Aug. 1.

Photographed at its first showing in Seattle, Wash., S. Morgan Smith's new master trade exhibit was designed for flexibility and long life. It is a self-contained unit enabling the company's Turbine and Valve Divisions to display equipment in booth frontages varying from 20 to 40 ft. It requires no rented properties; has everything from chairs to a rubber tile floor; invites visitors to stop. It can be quickly erected and taken down

• **J. H. Stumph,** 1000 Fourth Ave. South, Seattle 4, Wash., has been appointed conduit representative in the northwestern United States for the Spang-Chalfant Division of The National Supply Co. His area covers Idaho, Montana, Oregon, and Washington. Stumph is a graduate electrical engineer and has had broad experience in the electrical raceway field.

• **Howard M. McNeil** has been made wire and cable specialist of General Electric's Construction Materials Division for the central and northwestern districts with office at 650 17th St., Denver. He will cover the territory from Omaha to Salt Lake City. He is a graduate of electrical engineering from the University of Utah.

• **Ted Ford** recently became engineer and service representative for Standard Trailer Co., of San Leandro, makers of hydraulic equipment for utility line trucks. He had been eight years with the Earl S. Condon Co. in Los Angeles.

• **United States Rubber** Co. has oppointed Electric Heater Sales Co. of Klamath Falls, Ore., as Uskon distributor for the state of Oregon. **Carrol C. Colvin** is owner of Electric Heater Sales.

• **E. T. Larsen** and **Dr. W. C. Rueckel** have been made vice-presidents of the Henry J. Kaiser Co., Oakland, Calif. As manager of engineering, Larsen will be responsible for all engineering activities for Kaiser Engineers. Rueckel will be manager of development and sales. His responsibilities will include general development work, including the new oxygen steelmaking process and work on atomic energy.

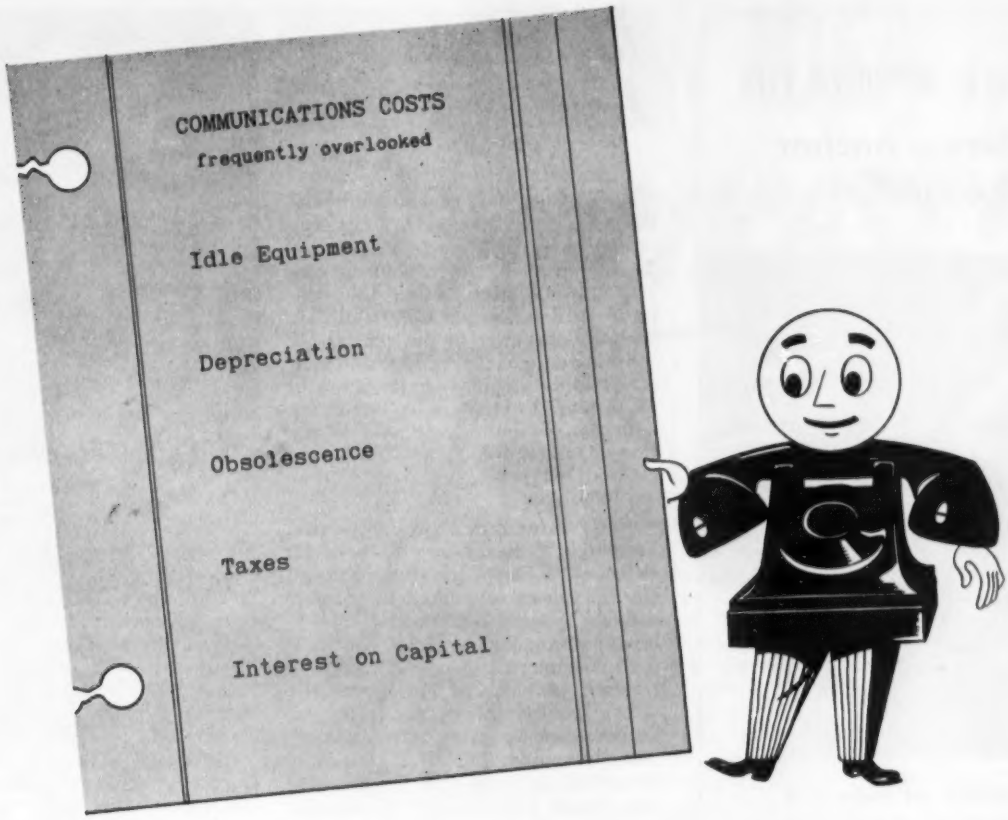
• **Marvin Mfg. Co.,** makers of Marco lighting fixtures and ventilating fans, has moved to a new factory at 648 Santa Fe Ave., Los Angeles. The new plant has 75,000 sq ft of floor space, parking facilities for 120 cars, spur track and overhead conveyor system. The company has enlarged its sales force. **Carl Anderson** has been appointed district sales manager for southern California and Arizona.

• **Expanding** its Tube Division, Westinghouse has established a new regional headquarters office, laboratory and warehouse building at 11470 Tennessee Ave., West Los Angeles. **Gilbert Sherman,** Pacific Coast regional tube manager, has appointed **Earl F. Larson** as sales application engineer for the South Pacific district, with headquarters in Los Angeles; **Robert E. Thomas,** sales application engineer for Central Pacific district, with headquarters at San Francisco; **Maurice Birt,** manager of customer service and tube warehousing.

• **Robert J. Cole** has been named Pacific Coast manager for the Construction Materials Division of John A. Roebling's Sons Corp. He will direct the sale of wire and stranded steel products for prestressed concrete use.

• **Mel Pearson & Co.** of Denver has been appointed manufacturer's representative for Markel Electric Products and LaSalle Products of Buffalo. From headquarters at 1011 S. Josephine, Denver, he will cover the states of Colorado, Utah and Wyoming.

• **Westinghouse Supply** Co. has appointed **Joseph C. Givens** as San Francisco-Oakland manager of consumer products.



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NEWS ABOUT PEOPLE

• **L. W. Coughlan,** general auditor of Pacific Gas and Electric Co. has been promoted to assistant comptroller. **T. R. Salm** will succeed him as general auditor. Coughlan joined the utility in 1916 at Nevada City, Calif. He became supervisor of the central accounting department in 1939 and general auditor in 1951. Salm came to PG and E through its consolidation with San Joaquin Light and Power Corp., Fresno, which he joined as a clerk in 1941.

• **Staff attorneys Paul E. Sloane, Frederick T. Searls** and **Richard H. Peterson** of Pacific Gas and Electric Co. have been appointed to posts as assistant general counsels. Sloane will be responsible for franchises, contracts with customers, collections, mortgage releases, problems arising under the state's freeway construction program, business license taxes, land matters (except eminent domain), and zoning. Searls will be responsible for proceedings before California PUC and for rate proceedings before FPC. Peterson will handle equipment, construction, natural gas and fuel contracts, tax problems generally, litigation (except personal injury and eminent domain), corporate proceedings, and insurance.

• **Eugene A. Bromagin** has resigned as Denver street lighting engineer to take a position with Westinghouse Electric Corp. as sales engineer in its lighting division for midwestern states.

• **In recent changes** in the Utilities Division of the California Public Utilities Commission, **John J. Doran** of San Francisco was promoted to electrical engineer in charge of the electric section and **Clarence Unnevehr** was advanced to valuation engineer.

• **William J. Borwick,** district manager at Portland for United States Steel Supply Division of U. S. Steel Corp., has been made manager of the division's St. Louis district. **David G. Gotthardt,** who has been office manager in Portland since 1950, succeeds Borwick as district manager.

• **Warren L. MacDonald** has been made district manager of the Los Angeles office of Combustion Engineering Inc. He was project engineer for the Fluor Corp. until June 1951, when he joined Combustion Engineering.

Beard

• **George L. Beard,** an engineer in the chief of the Corps of Engineers' office in Washington, D. C., since 1937, has been appointed assistant vice-president of Pacific Power & Light Co. President Paul B. McKee announced Beard will be in charge of the utility's long range hydroelectric planning and development program. Beard made frequent field trips to the Pacific Northwest while preparing the corps' 308 report. His latest corps' assignment has been the supervision of river basin planning and development throughout the U. S. He is a graduate of the University of Michigan.

• **Edward R. Lee** Jr. has been appointed power engineer for Kaiser Engineers Division of Henry J. Kaiser Co., George Havas, vice-president and general manager, announced. In power plant engineering for more than 20 years, Lee has been mechanical and consulting engineer with the Kissick Co., New York City, for the past three years. He was mechanical engineer for the J. G. White Engineering Corp. of New York City for 10 years previously.

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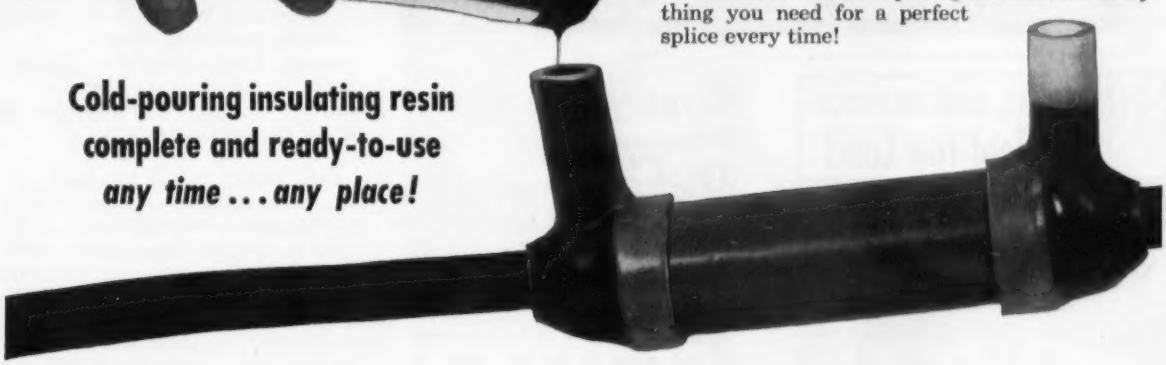

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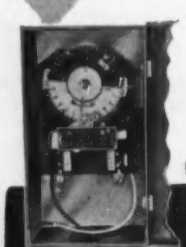
ASTRONOMICAL CONTROL

Now ready, as a kit, to fit any regular model on the job. Simple to change. Saves time—Saves money.

ON AT SUNSET—OFF AT SUNRISE or a fixed time, 10:30 p.m. to 1:30 a.m.

- Tork Time Switches require no attention—this feature $12.00. A must on all public safety lighting. An economy on all commercial lighting. Tork is fully automatic. No one forgets.



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• **Henry C. Rice** closed his desk at Southern California Edison Co. Aug. 1 to retire after 37 years in sales, from cub salesman in 1917 through merchandise manager and finally sales manager. No plans were announced but since he is still aggressive and sales minded, expect to see him still selling either appliances or wiring, his lifelong mission. Under his direction twice Edison Co. has won the George A. Hughes Award. He served as Business Development Section chairman of PCEA, represented utilities on the NFPA Electrical Committee and on IAEI Southwestern Section executive committee.

• **Frank M. Lewis,** Bonneville Dam project engineer for eight years, has been named coordinator of operations and maintenance of multipurpose projects in the North Pacific division of the Corps of Engineers. He moved to the new job Sept. 1. An electrical engineer, Lewis has been with the corps since 1935. **Albert M. Capps,** chief of operations at Bonneville for the corps, will succeed Lewis as Bonneville project engineer.

• **Tacoma** Public Utilities Board has elected **Tom W. Anderson** as its new chairman, with **Alfred J. Johnson** vice-chairman and **Warren S. Lagerquist** secretary. Anderson, co-owner of the Concrete Engineering Co., succeeds Gerrit VanderEnde in the position, which rotates each year among members of the five-man board.

• **Edward E. Scott** has been appointed headworks superintendent on the Skagit project of Seattle City Light to succeed **Dana Currier,** who has retired after having served on the project since its inception in 1920. He joined the utility on the Skagit in 1927 as a machinist, since then has been machine shop foreman, Skagit mechanical foreman and assistant headworks superintendent.

• **Victor I. Corbell** is the new president and **Bert M. Pringle** the new vice-president of the Salt River Project, irrigation and power district in central Arizona. For Corbell it was a promotion from vice-president succeeding W. W. Pickrell.

• **Edgar C. Metcalf,** who has served as project engineer for the Rock Island Dam and power plant expansion project of the Chelan County PUD, has been named power supply chief for the PUD, with headquarters at Wenatchee, Wash. He will have charge of preliminary work on the PUD's proposed Rocky Reach Dam on the Columbia River and a Wenatchee-Chiwawa River project.

• **Frank R. Jamison,** public relations counselor for Public Service Co. of Colorado, retired June 30. Jamison had been director of advertising and publicity for 31 years before becoming counselor two years ago.

• **George Maves,** former manager of the Boston sales office of Minneapolis-Honeywell Regulator Co., has been made manager of the Pacific region, with headquarters in Los Angeles. He succeeds **Gavin S. Younkin,** who was named general sales manager of the company.

• **J. D. Webster** has been transferred from San Francisco to General Electric Co.'s X-Ray Department in Milwaukee as manager of industrial sales. He had been sales engineer in the Apparatus Division at San Francisco since 1951.

• **C. L. Peterson,** with Minneapolis Honeywell Regulator Co. from 1927 to 1950, has been made divisional vice-president of the Brown Instruments Division.

• **Fred R. Roper** has been appointed assistant manager of the advertising department of Standard Oil Co. of California.

Deaths

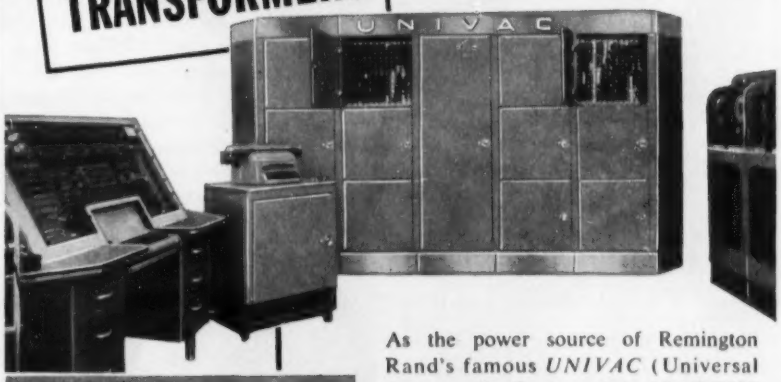
• **C. Albert Kulman,** 54, San Francisco consulting engineer and authority on nomography, died Aug. 3. A resident of Kentfield, Calif., he was licensed in the state as a civil engineer, electrical engineer, mechanical engineer and contractor. He was a graduate of Stanford University. Following employment with Pelton Water Wheel Co. as design engineer and with Barrett & Hilp, he established his own office in San Francisco.

• **George R. Cooley,** 80, electrical engineer of Seattle, died there Aug. 14. Born in Minneapolis, he moved to Seattle in 1896, operated his own electrical contracting firm for 40 years, for several years was electrical engineer for the Northwest regional office of the Federal Public Housing Administration. He was a member of IES and IAEI.

• **Clarence S. Gracey,** 49, an electrical contractor in Sacramento, Calif., since 1942, and formerly in the same business in Denver, Colo., died July 26.

• **J. C. Henkle,** retired general superintendent of Portland General Electric Co., died August 18. He retired in 1952.

MARCUS dry type TRANSFORMERS ...power this "Electronic Brain"



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As the power source of Remington Rand's famous *UNIVAC* (Universal Automatic Computer), MARCUS TRANSFORMERS perform their valuable function within this Electronic Brain.

Every MARCUS dry-type Transformer . . . whatever its class and for whatever its purpose, is constructed to far exceed its particular specification demands. Every detail and component of MARCUS dry-type transformers is carefully engineered for *longer life* and uninterrupted trouble-free performance!

MARCUS Series 5000 dry-type "Class B-plus" Transformers are designed to exceed specifications by approaching "Class H" insulation, yet operating at "Class B" temperatures.

Capacities from 1 to 3000 KVA

- DISTRIBUTION
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- PHASE CHANGING
- ELECTRIC FURNACE
- RECTIFIER
- WELDING
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- SPECIAL

CHECK THESE MARCUS B-PLUS FACTORS FIRST!

- *Higher Dielectric Strength!*
- *Greater Protection Against Surges!*
- *Better Protection Against Moisture!*
- *Greater Capacity for Overloads!*
- *Quieter Operation!*
- *Proven Dependability!*

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PIONEERS IN THE FIELD OF DRY TYPE TRANSFORMERS

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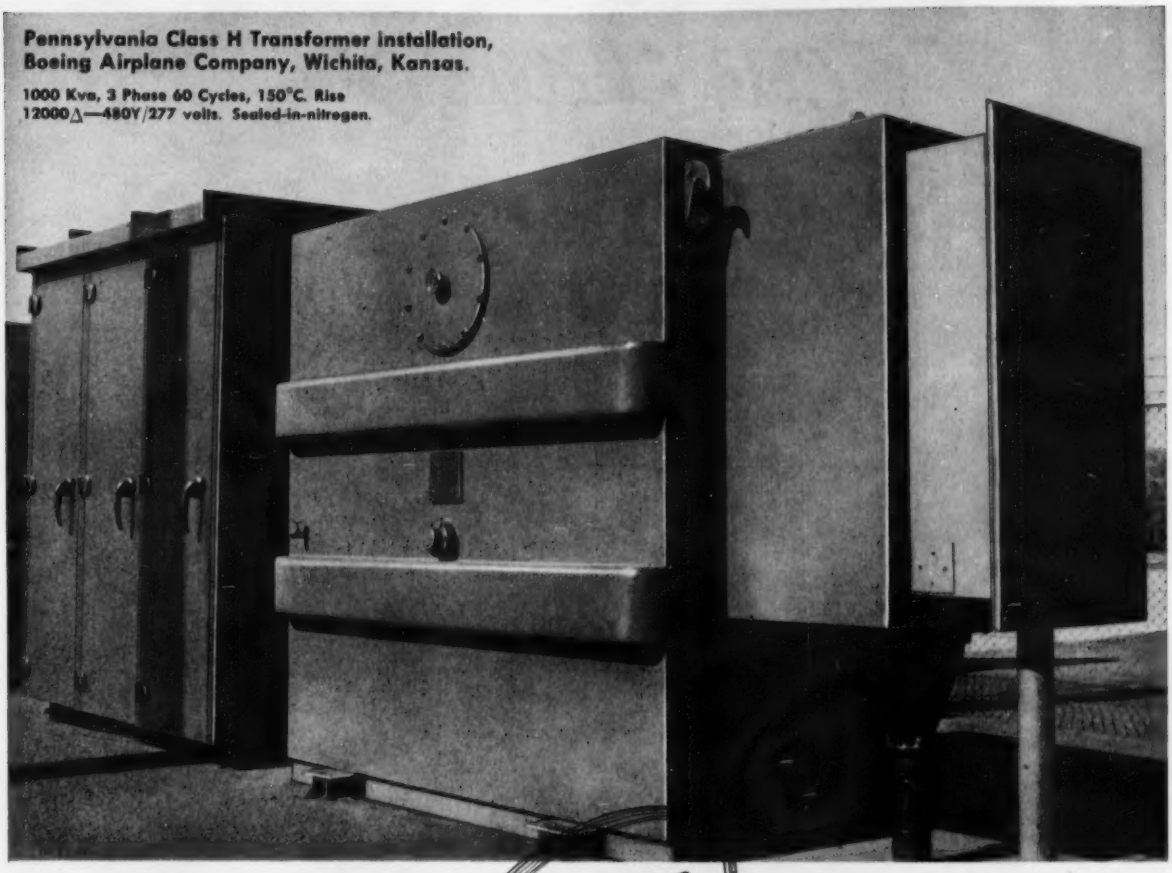
PROFILES

Taken at the recent joint meeting in Portland of the Northwest Electric Light & Power Assn. Personnel Section and the Edison Electric Institute Industrial Relations Committee, these pictures show: right, Personnel Section officers for the coming year —Russell James, Portland General Electric Co., vice-chairman and Peter Piper, Washington Water Power Co., chairman. Below, George Sullivan, PGE; W. L. Vinson, IBEW Local 125, a luncheon speaker; Waldemar Seton and Thomas W. Delzell, both of PGE. An account of the joint meeting was given in the August issue on page 101

As Ted Gerlishe, consulting electrical engineer, Oakland, wound up his successful year as president of East Bay Electric Club, Roy Kimberlin, Graybar's San Francisco district manager, came over to inaugurate Mark Wilkins, Oakland branch manager of Graybar, as the new president for the year beginning in September. Frank Rothganger, Pacific Gas and Electric Co., was elected vice-president and John Schreiber, General Electric Co., secretary-treasurer. Meetings were recessed during summer; were to begin again in September



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VENTILATED	UP TO 3000	UP TO 15 KV
SEALED IN NITROGEN	UP TO 2000	UP TO 15 KV

Consider these Advantages:

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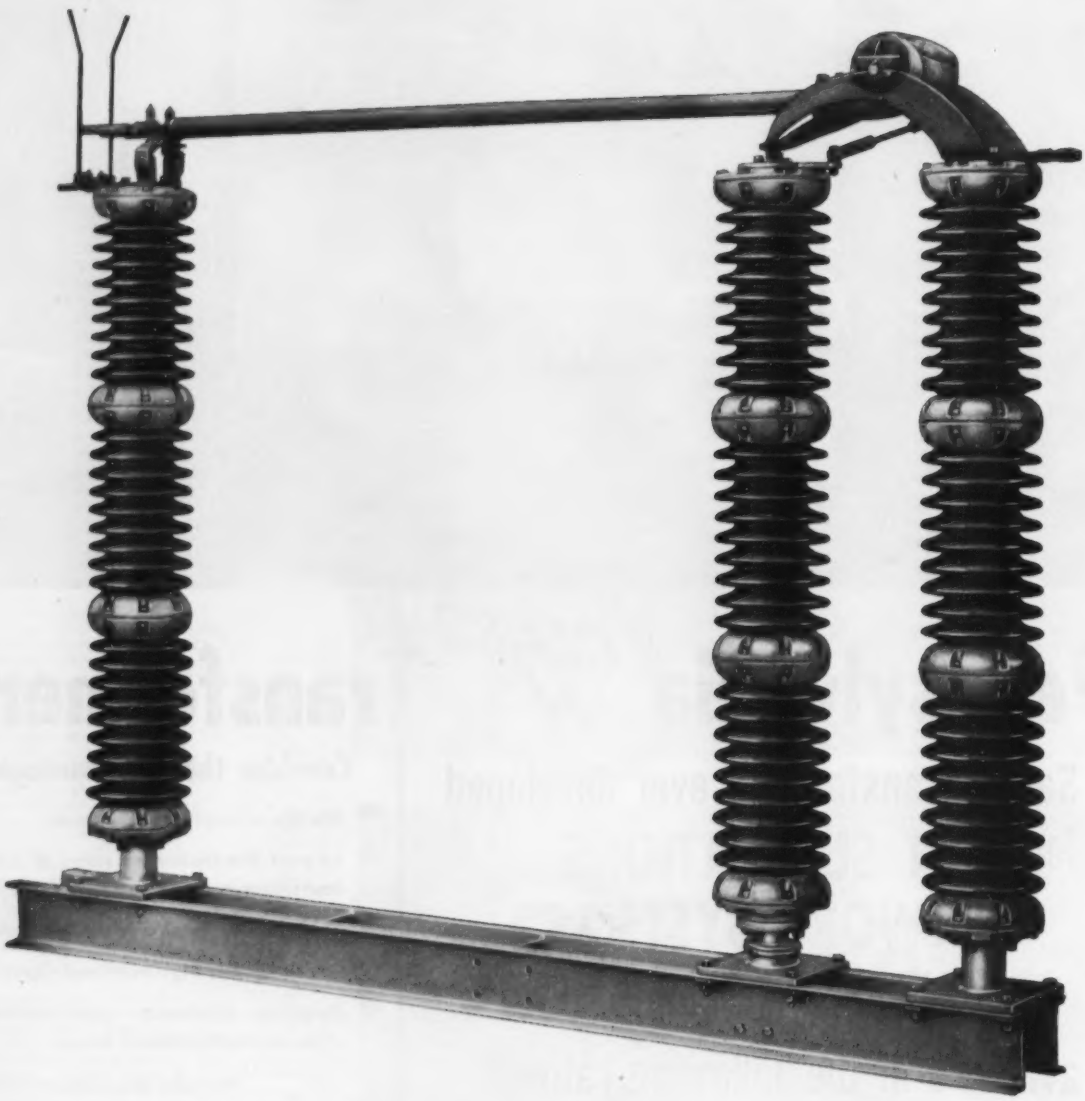

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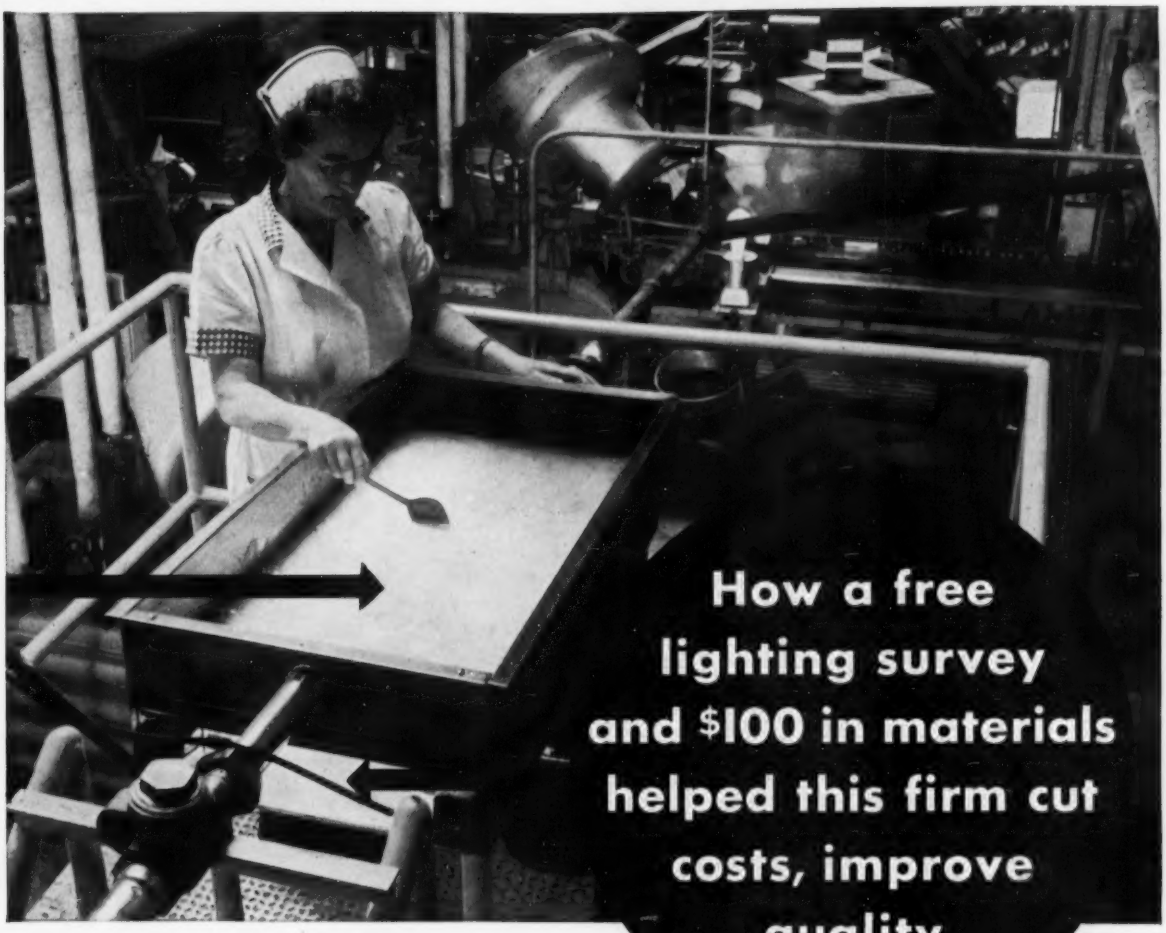

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MEET A LIVE WIRE!

Charles W. Goodwin, Jr.

elected a Vice President of PCEA in May of this year, is no stranger to the Association, having been a member since 1925. During this time he has served on the Membership and Nominating Committees, has been exceedingly active in the Business Development Section and is now in his seventh year on the Board of Directors of PCEA.

A native Californian, Goodwin was born and raised in the "City By The Golden Gate." He began his business career with San Francisco's old Pacific States Electric Company, later taken over by General Electric Supply Company in 1929. Starting as an office boy in 1910, he stayed with the same firm all the way, progressing up through the ranks to Credit Manager, Sales Manager and finally to District Manager, G. E. Supply Company—the post he has held for the last 19 years.

A capacity for hard work, a determination to reach the top and active participation in your industry's trade association are qualities hard to beat in the never-ending competition for personal success. And of the three, none is more important than "active participation in your trade association." In the electrical industry, PCEA offers you that opportunity — the chance to achieve a fine record of helping to improve the industry's service to its customers. There is always room for improvement in an industry as dynamic as ours. You can help, and you will benefit, by joining us in PCEA.

Pacific Coast Electrical Association

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